LAWRENCE

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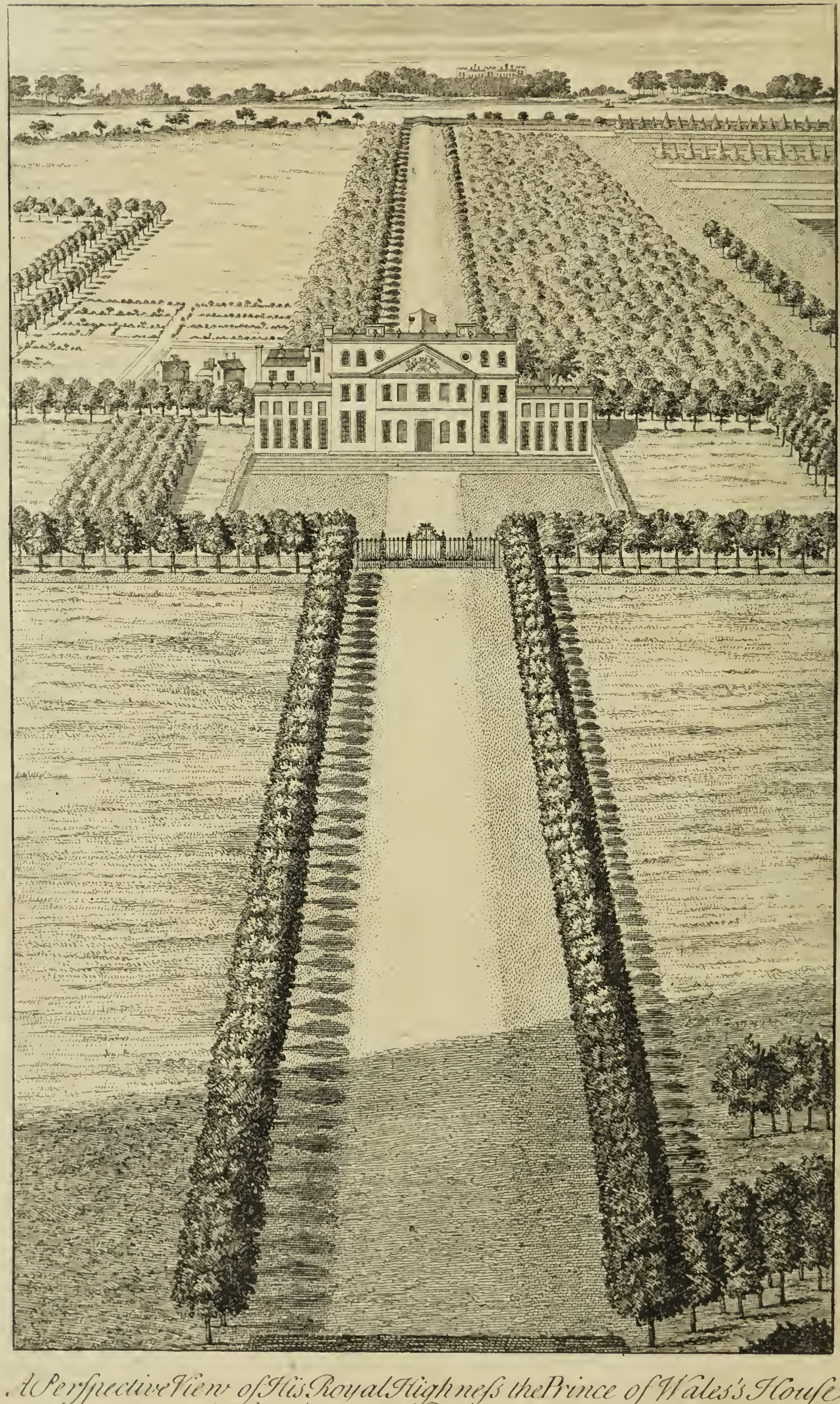

A Perſpective View of His Royal Highneſs the Prince of Wales's Houſe and Gardens at Richmond.

J. Vander Gucht Sculp.

A

NEW SYSTEM
OF
AGRICULTURE.

BEING A
COMPLETE BODY
OF
Husbandry and Gardening

In all the Parts of them. *Viz.*

Husbandry in the FIELD, and its ſeveral Improvements.

Of Foreſt and Timber Trees, Great and Small; with Ever-Greens and Flow'ring Shrubs, *&c.*
Of the Fruit-Garden.
Of the Kitchen-Garden.
Of the Flower-Garden.

In FIVE BOOKS.

CONTAINING

All the beſt and lateſt, as well as many new Improvements, uſeful to the *Husbandman*, *Grazier*, *Planter*, *Gardener* and *Floriſt*.

Wherein are interſperſed

Many curious Obſervations on Vegetation; on the Diſeaſes of Trees, and the general Annoyances to Vegetables, and their probable Cures.

As alſo a

Particular Account of the famous *SILPHIUM* of the Antients.

By *JOHN LAURENCE*, M.A.
Rector of *Biſhops-Weremouth* in the *Biſhoprick of Durham*, and
Prebendary of the Church of *Sarum*.

> Omnium autem rerum ex quibus aliquid acquiritur, nihil eſt Agriculturâ melius, nihil uberius, nihil dulcius, nihil homine, nihil libero dignius. *Cicero de Offic. Lib.* ii. *Cap.* 42.
>
> Nec verò dubitet Agricola, quamvis Senex, quærenti cui ſerat, reſpondere; Diis immortalibus, qui me non accipere modò hæc à majoribus voluerunt, ſed etiam poſteris prodere. *Cato Major*, *Cap.* 7.
>
> Ταῦτα δὴ, ὦ Κριτόβουλε, ἐγὼ διηγοῦμαι, ἔφη ὁ Σωκράτης, ὅτι τῆς γεωργίας οὐδ' οἱ πάνυ μακάριοι δύνανται ἀπέχεσθαι. Ἔοικε γὰρ ἡ ἐπιμέλεια αὐτῆς εἶναι ἅμα τε ἡδυπάθειά τις, καὶ οἴκου αὔξησις, καὶ σωμάτων ἄσκησις, εἰς τὸ δύνασθαι ὅσα ἀνδρὶ ἐλευθέρῳ προσήκει. *Xenoph.* Οἰκον. *Cap.* 5.

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TO

Her ROYAL HIGHNESS
THE
PRINCESS
OF
WALES.

MADAM,

I Eſteem it the higheſt Honour, to be permitted to dedicate the following Papers to Your Royal Highneſs; Whoſe known Character for Virtue and Goodneſs, for a ſingular and impartial Love of Truth, and for encouraging every uſeful Art and Science, cannot but derive Credit upon a Work publiſhed under Your Royal Highneſſes Protection.

The World will readily judge, that this Preſumption of mine could not proceed from any Inclination to flatter. For, That good Senſe and Judgment, joined with a moſt endearing Affability; which has rendred Your Royal Highneſs ſo univerſally eſteemed, and ſo juſtly beloved; makes You too Wiſe to bear Flattery, and too Good to need it. But the Diverſion your Royal Highneſs is ſometimes pleaſed to take, in viewing the Effects of ſuch Experiments as are the Subject of this Treatiſe; naturally led me to be ambitious of this Honour.

I have, for ſome Years paſt, employed my vacant Hours in recommending the innocent Diverſions of the Flower-Garden; in being an Advocate for the Culture of my native Countrey in general; and particularly in ſhewing the reſt of the World the growing Riches and Beauty even of that more Northern Climate, which has but lately been thought capable of Improvement. And nothing could be a more ſatisfactory Reward to theſe my Labours, than the being allowed to publiſh them under the Patronage of a Perſon, who is a perfect Judge even of theſe meaner Performances, at the ſame Time that

She is an Ornament to the Royal Family, and a Bleſſing to the Nation.

That Your Royal Highneſs may long live a Pattern of Virtue and Goodneſs, a Lover of Reaſon and Truth, a Friend to Virtuous Liberty, and an Enemy to the Antichriſtian Spirit of Popery, whereſoever found; And that theſe Kingdoms may, to the lateſt Poſterity, continue to be governed by Deſcendents inheriting theſe Your Illuſtrious Virtues, which are the greateſt temporal Bleſſings to Mankind; is the Prayer of,

MADAM,

Your Royal Highneſſes

Moſt Humble, and

Moſt Obedient Servant,

J. LAURENCE.

THE PREFACE TO THE READER.

IT is now twelve Years ſince I firſt began to treat upon the Subject of Vegetables. And in thoſe ſeveral ſmall Tracts already publiſhed I confined my ſelf to That Part only, which reſpects the *Fruit-Garden*, as what I thought would beſt and eaſieſt make its Way amongſt the Inquiſitive Part of the Nobility, Clergy, and Gentry. Whether I judged rightly or not, I muſt leave to ſuch Perſons, into whoſe Hands thoſe Books have fallen: But I muſt own my ſelf ſo far encouraged by the kind Reception of thoſe Books, that I have been ſeveral Years laying in Materials to do my Part to extend and enlarge the Knowledge of Agriculture in all its Parts.

I had at that Time the Honour of being the firſt and almoſt only Writer in this laſt Century, who had revived the Spirit of Gardening, and pretended to give a rational and intelligible account of the Laws of Nature, for the better and more regular Government of Fruit-trees, hitherto but imperfectly underſtood, and therefore very darkly explained. Since which Time there have aroſe other Authors, and very many Books have been wrote on the Subject to pleaſe the Taſte of the Age; ſome of which have furniſhed us with diverting and ingenious Novelties: tho' it muſt be confeſſed, that ſeveral others have rather obſcured the Subject, and confounded the Reader; eſpecially the *Dictionary* Writers, by inſerting *all* promiſcuouſly, both good and bad, from other Authors.

As every Age of Life hath commonly its Amſuements (the more innocent the better) peculiar to itſelf; ſo almoſt every Age of the World hath been remarkable for ſome one particular Purſuit of Knowledge, wherein Men have excelled to the Advantage of their Fellow Creatures. This Age, it is plain, ſeems to taſte and reliſh every thing new on the Subject of vegetable Nature; and Men are eager in their Enquiries into its Receſſes. Great Light hath been ſtruck, and more Remains to be let in. Which Conſideration, inſtead of diſcouragement, ſhould be an Argument to excite Mens Zeal, and enflame their Ambition to find out Truth.

Many in the World are apt to be diſcouraged in their Purſuit of Knowledge, when they ſee and conſider the Difficulties that lie before them; or when they obſerve that moſt Sciences have their Chimæra's, after which Men are wont to run without ever overtaking them: Whereas at the ſame Time it ſhould be owned, that they are often the Occaſion of our finding out many uſeful things in the Way.

It doth not require a great deal of the Spirit of Prophecy, to ſay, that as long as the World laſts, the Pleaſures and Entertainments which Gardening and Agriculture afford, will be the purſuit of wiſe Men, who, whilſt they find and reliſh Retirement, will alſo find the Pleaſure of enquiring into the Powers of Nature, whoſe Returns are abundant Recompences for their moſt laborious Searches. And happy ſurely they, who find Satisfaction in thoſe ſo innocent Pleaſures, inſtead of diſturbing the World or their Neighbours, when they cannot be quiet themſelves, tho' no body hurts them. The Evening of Life is thus, to be ſure, moſt wiſely and agreeably ſpent. When the Decline of Nature tends to peviſhneſs and a froward Weakneſs, and we cannot ſo firmly bear the Frowns of Fortune, the Ingratitude of a Friend, the Malice and

Treachery of an Enemy; then to ſtep aſide, as it were, out of the World a little before our Time, and give ſuch a decent Turn to our Thoughts, as may hide the Weakneſſes of human Nature, and at the ſame Time recreate our Minds with innocent and advantageous Pleaſures, hath always been, and muſt always be, accounted Wiſdom.

It muſt be owned indeed, that the *Town* hath its Pleaſures as well as the *Countrey*; And if Virtue were the Rule and Guide of Mens actions, as Man was made for Society, the Delights of Company and Converſation ought to be preferred to a private Life, and to all the Charms that vegetable Nature affords us in Solitude and Retirement. But how alluring ſoever the Pleaſures of the *Town* may ſeem to us, whilſt Health and Strength and the Gaities of Youth laſt; yet conſidering the Difficulties and Dangers, with which a Freedom in Converſation is commonly attended, as alſo the Envy, Malice, and Double-dealing ſo frequent in the moſt buſy Parts of the World, which tend to mar all thoſe Delights; we ſhall be inclined to declare in Favour of the innocent Simplicity of a Countrey-life.

The antient Heathens, Moraliſts and Philoſophers, are ſo full of this Way of reaſoning, that you no ſooner dip into their Writings, but you find beautiful Deſcriptions of the Pleaſures of Agriculture, and frequent Examples of Men of great Merit, who fled from the tumultuous Hurry of Cities filled with raging Paſſions, that they might recreate both their Minds and Bodies with rural Exerciſes.

If Clergy-men and other ſtudious Perſons, that have a Taſte for Beauty and Order, really want theſe reputable Relaxations, I hope there will not need a Juſtification of my ſelf, that I here amuſe my ſelf and others of my own Profeſſion with ſtudies ſo ſeemingly different from it. Let the Reader look back to that Place in *Tully*'s *Cato major* quoted in the Title-page, and he will ſee a noble Sentence and Sentiment of an old Heathen, which may be lookt upon as a Leſſon to Chriſtian Clergymen, and is at the ſame Time a full Juſtification of this my Undertaking.

And truly I cannot but here take Occaſion to exhort all Philoſophical Gentlemen, to employ a reaſonable Share of their Thoughts and Experiments on the Subject of Agriculture, as a more becoming Exerciſe and Relaxation than Hunting or Cards; and to be ſure, more conducing to the Health of the Body, the Strength of the Mind, and to the Capacity of Generoſity in the Fortune, than many other faſhionable but criminal Exceſſes. For it ought to be obſerved, that it is an Employment, which will at once contract their Wants, and give a larger Ability to ſupply them; 'twill give greater Reliſh to the Enjoyments of Life, and make every Part thereof ſweetly varied between joyous Eaſe and delightful Labour.

If there are any who can complain of the Toil of that Pleaſure I am perſuading them to undertake and enjoy, let them conſider that juſt Admonition of *Epicharmus* cited and applauded by *Socrates*, τῶν πόνων πωλοῦσιν ἡμῖν πάντα τ' ἀγαθ' οἱ Θεοὶ. And the wiſely choſen Motto of our preſent excellent Lord Chancellour, is the grateful Sentiment of a Mind who hath purchas'd Happineſs by theſe Means. *Labor ipſe Voluptas.* The *Greek* is an Explication of the Charter which God gave to Man when Husbandry was firſt made Neceſſary; the *Latin* admoniſhes us with what Thankfulneſs Man ought to receive the Puniſhment inflicted by infinite Goodneſs.

If Gentlemen could perſuade themſelves to caſt their Eſtates into Beauty and Order, they would quickly experience it the nobleſt Exerciſe and greateſt Delight.

The *Deſigning Arts*, are unqueſtionably the moſt becoming Retirement, as well as moſt natural Enjoyment of Life. God made Man as ardently deſireous of the Beauty of *Order*, as of any Indulgence of Senſe. The *laſt* may be an Injury to others: But the Love of the *firſt*, within the Bounds of a generous Frugality, is a Bleſſing; becauſe it gives Politeneſs and Ornament to a Nation. If a Circle drawn on the Sand could make an old Ship-wrack'd Philoſopher cry out; *Courage! my Companions, here are humane Creatures live in this Iſland;* ſurely the Sight of every Portion of a Countrey drawn out into all the regular Variety of ſome noble Deſign, will give Evidence of a Love for *Beauty*. Which is indeed an external Proof of a Love for *Humanity:* for none can be greatly tranſported with Beauty and Regularity amidſt Plantations, and the Gracefulneſs of Order in inanimate Proportion but he muſt be much more ſo by the diviner Harmony of a *vir-*

tuous Conduct. And if Variety in Uniformity is what delights Human Minds; what greater united Variety, than beholding all the Duties of Life drawn from the one Principle of Chriſtian Charity, or a deſire to make Happineſs enjoyed, in proportion to the Merits and Capacity of Creatures endued with Senſe and Underſtanding?

Beſides it is to be conſidered further, that the Delight in adding Beauty to a Countrey here recommended, is likely to extinguiſh that Secularity of Spirit, that ſelfiſh Taſte, which ſo much reigns in the World. For this is ſo evidently labouring to pleaſe others, that no Man can be pleaſed long with what himſelf *doth*, if he did not believe that others would be pleaſed with what he *hath done*; and none could preſerve a wrong Taſte, if there were not others to admire and applaud it. The general Admiration which every Age hath ſhewn for the *Quincunx Order*, is a full Proof, that Beauty conſiſts where the ingenious Mr. *Hutchinſon* and *Monſ. Crouſaz* place it; *viz.* in *Variety* amidſt *Uniformity*: And this, every Farm may have added to it by ſmall Expence and agreeable Labour, and become more Convenient as well as more Beautiful. What a Field of Pleaſure then is here, for a virtuous Man; whoſe Products are more Reliſhing than what Vice can pretend to offer; where Reaſon will deſire the Aid of Imagination, which yet ſubmits its Inventions to Reaſon; where he may indulge in what will at once improve his Pleaſure, his Fortune, and his Mind; in what will promote the Cauſe of Virtue, the Good of his Countrey, and the Intereſt of his Family.

If we conſult the ſacred Hiſtorian, we ſhall ſee, that in the Beginning, even before Sin enter'd into the World, *God planted a Garden, wherein were made to grow every Tree that is pleaſant to the Sight, and good for Food, and there he put the Man whom he had formed, that he might till it and keep it*, Gen. ii. 8, 9, 15. And thus alſo we ſhall find, according to the Language of the Poets, that the Golden Age was ſpent not in Cities, but in the Countrey; where the firſt, moſt innocent, and happieſt Men, applied themſelves to cultivate the Earth, no leſs for their Pleaſure than Advantage.

Not that it would be a reaſonable Attempt, to perſuade all Perſons to turn Farmers and Countreymen. Men may be uſeful as well as neceſſary in every Station of Life. Multiplicity of Buſineſs in ſome, and the Love of Eaſe and Voluptuouſneſs in others, hinder both the Study and the Practice of Husbandry; ſo that the Culture of the Earth is now fallen to the Lot of Men, whom we eſteem ſervile and born to Labour. However, it were to be wiſhed, that Men of Thought and Leiſure would more apply their Study and Care to improve their Eſtates; that they would join Experience and Practice to Theory, and do their utmoſt to perfect the Knowledge of Agriculture and Planting, and this with the ſame Diligence wherewith we ſee others have endeavoured to bring to Perfection divers Arts and Sciences, that are leſs uſeful in Life.

The Philoſophical Tranſactions of the Royal Society are ſtanding Memoirs of the Zeal and Activity of many Perſons of Quality and Learning, that have made ſeveral excellent Diſcoveries to this End; having advanced much Light in the Art of Husbandry, by their learned Diſcourſes and Experiments.

What I aim at in the following Papers, is to diffuſe, improve, and lay open all ſuch important Secrets, as are fit for Countrymen and Peaſants to know; to inculcate even on the common People all the moſt rational Methods of improving Land, and managing Farms to the beſt Advantage; and to add all the late and uſeful Diſcoveries of the Learned, that relate as well to Agriculture as Gardening; that the World may reap the Advantage of them in regular Crops and plentiful Harveſts: And that we may no longer have Reaſon to apprehend thoſe dreadful Scarcities, with which both City and Countrey have from Time to Time been ſo ſorely and grievouſly afflicted.

Some perhaps would expect, that a Performance of this Nature ſent into the World under the Name of a Clergyman, ſhould have had the uſual Embelliſhments of Marginal Notes from the *Antients*, to ſhew that I had conſulted what *they* had all ſaid *de Re Ruſticâ:* And that, in the Body of the Book, according to the Faſhion of ſome Moderns, I ſhould have diverted the Reader with frequent Citations from the *Greek*, *Latin*, and *Engliſh* Poets. This I might have done, and have acted the Part of the Philologer, as well as the Philoſopher and Husbandman; but that I think ſuch a laborious

Search, at beſt, only like other *difficiles Nugæ*, a pompous Way of ſaying nothing to any real Advantage or Advancement of Knowledge. I confeſs therefore I have voluntarily omitted ſuch uſeleſs Learning; my End in writing, being to *inſtruct*, not to *amuſe* the Reader with Authorities from thoſe who knew little of the Matter, in Compariſon of the Light we now enjoy. So that though I might without much Difficulty have put on the Ornaments of the Scholar; yet I rather choſe to appear *Simplex Munditiis*, to dreſs with nothing but that natural Evidence and Beauty, which the Importance of the Subject required to recommend my Diſcourſe.

Gratitude, and a becoming Senſe of the Favour of my Lord Biſhop of *Durham*, naturally invite me to take Notice here, that by his Lordſhip's Bounty I have been removed (very agreeably) into the *Biſhoprick of Durham*, which may properly be called the *Garden of the North*. For if Trade, and a Multitude of Inhabitants; if the natural Riches of the Countrey, and Wealth, acquired and improved by the haſty Diligence of a wiſe and polite People; if the natural Goodneſs of the Soil, and the Situation of the greateſt Part of the County; if any, or all of theſe, tend to make Improvements both in the Field and Garden; here we may ſee them all, growing and increaſing every Day into ſuch Beauties, as raiſe a very agreeable Surprize in Strangers, too often prejudiced againſt the *North*. Theſe Things have opened to me a new and different Scene, and have given me Opportunities (as the Reader will obſerve) to take Notice of many Things worthy of Imitation, and to ingraft upon them ſome other Improvements, not yet put in Practice.

It is fit that I ſhould here acknowledge, and put the Reader in Mind, that in treating of Forreſt-Trees, I have made Uſe of the ingenious Mr. *Evelyn*, who hath wrote with moſt Senſe on that Subject; endeavouring to reject what is ſuperfluous, or too much tending to Superſtition, the Bane of all true Knowledge: And moreover, that I have been beholden to Mr. *Houghton* on Husbandry; and withal, that I ſhould have made more Uſe of Mr. *Mortimer*, but that I found I could not depend upon him; being at the ſame Time well aſſured, that if a Farmer was to practiſe every Thing, and in the Manner he recommends it, he would ſoon become a Beggar.

I have been honeſt and careful not to miſlead the Husbandman, by indulging any mere Speculations, or recommending what I am not ſure is true and profitable. I could have indulged my own and the Reader's Fancy, like too many Authors on this Subject, with Variety of Methods of Improvement, which might have promiſed Mountains, but would have diſappointed the Hopes of the Induſtrious, that ſhould endeavour to reduce them into Practice. Such *Chimera*'s are what delight and flatter the Covetouſneſs of the Reader, but (like *South-Sea-Stock* in the miraculous Year 1720.) they would bring thoſe that truſt them to real Poverty, by tempting them to catch at imaginary Riches.

Let not the Farmer expect Novelties in every Page; let him not wonder if he finds his every-day Practice plainly and conciſely related. My Book is not (as I have obſerved) deſigned to *amuſe*, but to *inſtruct*; being filled with Truth, not Fancies. And Truth is ſo plain and obvious, that in great Meaſure 'tis known to all in every Age: And thoſe Diſcoveries which are here new and firſt mentioned, are ſo genuine and ſo natural, and ſo reſembling to common experienced Maxims, that People will ſcarce believe that they are not part of the moſt obvious Methods.

I think it not becoming the Integrity of my Character, to miſlead. And therefore when I am not quite certain of what I publiſh, I mention my Diffidence, and give warning that if any try what others recommend or I relate with Caution, they may not blame me. 'Tis right to propoſe things to Conſideration, to incite to experiments to engage the Abilities of others to improve further. And often a Hint (tho' not exactly true, as firſt given) may occaſion the nobleſt Diſcoveries.

I could eaſily have ſwelled the Book to a greater Bulk; but I deſire to be as ſhort as is conſiſtent with Clearneſs; not aiming ſo much to write *Multa*, as *Multum*.

I have tranſlated one Chapter of *Kempfer*, which I hope will encourage ſome Perſon to give the Whole to the Reader. Scarcely can one find any where more curious Things concealed under dark Language. Reading him, is like travelling over thoſe craggy Rocks and rough Mountains, that he went over to gather his Obſervations and compoſe his Treatiſe. And many who would have been delighted with his fine Obſervations, could they have ſeen them at once, will not think it poſſible that any thing can reward them for the unpleaſant Pains of underſtanding him.

I ſhould think my ſelf extremely happy, if I could be inſtrumental in reviving among Gentlemen, whoſe Affairs do not oblige them to ſpend a great Part of their Year in *London*, a Spirit of improving their Eſtates and imploying their Time in making Experiments, which cannot be expected from the Farmer. He, whoſe thoughts muſt be fixed on making up his Rent and maintaining his Family by early and conſtant Labour, cannot venture the Expence of a Trial, which, if it ſhould not ſucceed, muſt deeply injure his Fortune, and half ſtarve his Children. But the very Pleaſure and Amuſement, which a Gentleman will find in ſuch Exerciſe of his Body and Mind, will be cheaply purchaſed by the Loſs he may ſometimes meet with.

How many Volumes of Mathematicks are daily compoſed, merely for the Pleaſure of the Study, without Application to any thing uſeful? Many Books were wrote on the Conic Sections, before the Uſe of any of them were ſurmiſed; tho' now we know that they are uſed by Providence in the Conduct of Nature; and, without ſuch formerly barren Meditations on the Properties of thoſe Figures, we at this Time ſhould not have rejoiced in the glorious Diſcoveries of a *NEWTON*.

The very Beauty of ſeeing ſuch infinite Variety of Truths united in one general Theorem, ſtrongly engaged in Mens Contemplations, before they ſuſpected that Planets moved in the Ellipſe; that *Projectiles* deſcribe a *Parabola*; that Fluids aſcend between Glaſs Planes, or in a Series of gradual Tubes, ſo as form an *Hyperbola*. From which ſurprizing Obſervation, the riſing of the *Juices* in Plants can alone be clearly explained.

Gentlemen therefore may at a ſmall Expence here employ their Philoſophical Thoughts, and preſerve their Health, if they cannot reap other Advantages: But frequently their Prudence and Care will have other Recompence, beſides that enjoyed in the very Labour and Search.

As Virtue and Wiſdom are their own Rewards, and the Reliſh in the Practice of them is infinitely more delightful than any other Enjoyments; yet they lead to every other Enjoyment which is worth deſiring: And as reading of Hiſtory, is it ſelf highly entertaining, yet, beſides the accompanying Pleaſure, a Man gains from thence Knowledge and Wiſdom in the Management of the higheſt Affairs in Life: So is Agriculture greatly delightful in the very Labour, as well as attended with the moſt advantageous Returns. 'Tis not like the Toil of the Hunter, where the Game when caught is deſpicable; but the Exerciſe thereof is as much more wholſome and more agreeable, as the Game (give me Leave to call it ſo) is more valuable.

But whether *Gentlemen will* live in the Countrey or no, moſt of *my Brethren* muſt, becauſe it is their Duty. Many of the common Diverſions they cannot attend with Decency; yet ſome Relaxation and Refreſhment they require. Their *Glebes* are therefore proper for that Purpoſe; and too many of them want not only the Amuſement, but the Advantage which will ariſe from a skilful Labour. But I will not exhort them any farther in my own Words, but refer them to ſuch as will be more effectual. *Tully* makes *Cato* recommend *Xenophon*'s Œconomicks to *Scipio* and his Friend, as the moſt powerful Pleader for this noble Art. *Tully* was ſo delighted with the ſweet Simplicity and Majeſty of good Senſe which ſhines in that Treatiſe, that he tranſlated it into Latin. His Verſion is loſt, but the Original is ſtill preſerv'd, and will more effectually perſuade Men to love the Study of Husbandry, than any thing that I can ſay.

Xenophon hath obtained the Admiration and Love of every Age; and no Age was ever better inclined to regard the amiable, the elegant, the unaffected Neatneſs and Strength of that Author than the preſent: And I hope the Rules that Men are forced to admire, they will obey.

I will only add, and ſubmit with great Humility to our Legiſlature the Project of a Friend of mine, which will be a great Ornament to our Nation, without any Expence: That a Clauſe ſhould be added in every Bill for mending the Roads, (and it may be made to extend to thoſe already granted,) to oblige the Undertakers to plant and preſerve on each Side the Turnpike Roads, ſuch Timber-Trees as the Soil will beſt bear, and the Countrey wants; which will ſupply in Time the

Loſs of thoſe Woods that are daily deſtroy'd. If this Hint happen to make any Impreſſion, I may poſſibly my ſelf in due Time, communicate my Thoughts to the World, not only about the beſt Way and Manner of planting ſuch Trees in the Road for their future Security, but alſo concerning the cheapeſt and moſt expeditious Method of mending the Roads themſelves.

THE CONTENTS.

BOOK I.

THE Introduction. Page 1.
Chap. 1. *Of Air* 2
Chap. 2. *Of Earth* 11
Chap. 3. *Of Fire* 13
Chap. 4. *Of Water* 20
Of Incloſures 45
Of Meadows and Paſture Ground 51
Of making Hay 52
Concerning Arable Land and Tillage 54
Of the Plough, and the ſeveral Sorts of them 55
Of the Uſe of Tillage and Ploughing of Land 58
Of Ploughing of Land 59
Of the ſeveral Methods of laying up Lands in Ridges, in Order to the ſowing of them 62
Of the ſeveral Times and Methods of ſowing of Corn 64
Of the ſeveral Sorts of Soils good and bad, with ſome Directions interſperſed how to improve them 66
Of Dung, its Nature and Uſe for the Improvement of Land, and the ſeveral Sorts of it 69
Of the ſeveral Sorts of Dung ſtrictly and properly ſo called 75
Concerning other Materials to be uſed as Helps for Vegetation, and proper for Improvements 77
Of Lime 80
Of Chalk 81
Of Clay and clayey Land 82
Marle, its Improvement of Lands 85
Blood, its Uſe in Improvement of Land, &c. 87
Urine for Improvement of Land, &c. 89
Digging, its Improvement in Huſbandry 90
Concerning the ſeveral Sorts of Corn or Grain generally ſown in England, viz. *Wheat, Barley, Rye, Oats, Beans and Peaſe,* &c. *with the proper Methods for their Cultivation*

tivation and Increaſe 92
Of Wheat ib.
Of Barley 96
Of Rye 99
Of Oats 100
Of Beans and Peaſe, &c. 102
Of Corn Granaries 105
Of Hemp and Flax 107
Of Turnips 109
Of Carrots 112
Of Rape and Cole Seed ib.
Of Woad 113
Of Weld 114
Of Saffron 115
Of Liquorice 116
Of Madder 117
Of Teaſils 118
Of Hops 119
Of Malt 126
Of Cattle, ſuch eſpecially as are moſt uſeful and profitable to the Farmer 129
Of Milk 134
Of Butter 136
Of Cheeſe 139
Of Sheep 143
Of Goats 147
Of Swine ib.
Of the Rabit or Coney 149
Of ſuch Fowls as are moſt profitable to the Farmer 151
The Hen ib.
Turkeys ib.
Duck 152
Gooſe ib.
Pidgeon ib.
Peacock and Swan 154
Of Bees ib.
Of Silkworms 161
Of Fiſh Ponds 167
Of Mines, Minerals and Quarries 172
Of Copper 175
Of Tin 176
Of Iron and Iron Works 177
Of Allom 180
Of Lead 181
Of Salt, Sulphur, &c. in the Earth 183
Of Salt made, and Salt Works 186
Of Quarries, &c. 191
Of Coals and Cowke 194
Of Brickmaking 198

BOOK II.

Chap. 1. Of the ſeveral Sorts of Foreſt Timber Trees, great and ſmall, Evergreens and flow'ring Shrubs, ſuch as are found to grow in England without houſing, ſhewing their Nature, Uſe and Virtues Page 201
The Soil 202
The Seminary 203
A Catalogue of the ſeveral Claſſes of Foreſt Trees 206
Oak Tree 207
The Miſletoe 218
Aſh Tree 220
Elm Tree 223
Beech Tree 227
Aſpen and Poplar, Abele, &c. 229
Walnut Tree 230
Lime Tree 232
The Sycamore Tree 234
Alder Trees 235
Birch Trees 236
Hazel Tree and Filbert 237
The Horn Beam 238
Maple Tree 239
The Service Tree, or Sorbus 240
The Wild Pear, and the Crab 241
The Mulberry ib.
Cheſnut Tree 242
The Wild Cherry, black and red 244
The Quicken, or Quick Beam ib.
The White and Black Thorn, and Glaſſenbury Thorn 245
The Withy, Sallow, and Ozier ib.
Willow Trees 246
The Tamarisk 247
The Platanus, or Plane Tree ib.
The Elder and Medlar, and L'Azzerole ib.
The Lotus, the Cornel Tree, and the Larch or Larix 248
Buckshorn Tree ib.
The Acacia, and Buckthorn ib.
Chap. 2 Of the ſeveral Sorts of Evergreen Trees, great and ſmall, ſuch as will bear our Climate without houſing. 250

Of the Ilex ib.
The Holly Tree 251
The Yew or Eugh 252
The Philirea and Alaternus 253
The Box 254
The Cork Tree ib.
The Juniper Tree 255
The Laurel; Engliſh, Alexandrian and Cherry 256
Cypreſs Trees ib.
Fir Trees 259
The Pine Trees, &c. 260
Arbor Vitæ 263
Ivy, ſtrip'd and plain ib.
Savine 264
Pyracantha ib.
Celaſtrus and Arbutus 265
Cedar Trees ib.
Roſemary of ſeveral Sorts 267
Bay Tree ib.
The Laurus-tinus 268
Privet, Lentiſc, and Maternus ib.
Of Wood and Timber 269
Chap. 3. *Of Flow'ring Shrubs* ib.
Sena ib.
Laburnum ib.
Maracoe or Paſnon Tree ib.
Honeyſuckle 275
Pomegranate ib.
Solanum ib.
Meſereon 276
Gilder Roſe ib.
Roſe ib.
Lilac 277
Almond ib.
Jeſſamine ib.
Althea Frutex 278
Tulip Tree ib.
Spirea-Frutex 279
Spaniſh Broom ib.
Syringa ib.
Dog-Wood ib.
Sea-Ragwort ib.
Barba Jovis 280
Virgins Bower ib.
Periwincle ib.
Chap. 4. *Of the beſt Ways and moſt general Seaſons for ſetting Plants,* &c. 281

BOOK III.

O*F the Fruit Garden* 285
Chap. 1. *Of the moſt deſirable Situation for a Fruit-Garden* 286
Chap. 2. *Of the moſt deſirable Soil for a Fruit-Garden* 288
Chap. 3. *Of Planting: the beſt Method and Time of doing it* 289
Chap. 4. *Of Pruning* 294
Chap. 5. *Of the Vine* 296
Chap. 6. *Of the Peach, Nectarine, and Aprecot,* &c. 299
Chap. 7. *Of the Pear* 301
Chap. 8. *Of the Fig* 304
Chap. 9. *Of the L'Azarole* 305
Chap. 10. *Of the Mulberry* 306
Chap. 11. *Of the Apple* 307
Chap. 12. *Of the Medlar and Quince* 309
Chap. 13. *Of Grafting* 310
Of Grafting by approach 311
Chap. 14. *Of Inoculation* 321
Chap. 15. *Of Seminaries, the beſt Method of Ordering them, and furniſhing them with proper Stocks for Fruit* 323
Chap. 16. *Concerning the ſeveral Sorts of Stone-Fruit, how to diſpoſe them, whether for Walls, Dwarfs, or Standards, their Deſcription, their Order and Time of Ripening* 324
Of Peaches and Nectarines ib.
White and red Nutmeg Peach 325
Anne Peach ib.
Royal George Peach ib.
White and red Magdalen Peach ib.
Minion Peach ib.
Alberge Peach ib.
Burdine Peach ib.
Montabon Peach ib.
Belle Chevereuce Peach 326
Nobleſs ib.
Admirable ib.
New Newington Peach ib.
Old Newington Peach ib.
Roman Nectarine ib.
Elronge Nectarine ib.
Newington Nectarines 327
Dutch Tawny Nectarine ib.

Katherine Nectarine ib.
Chap. 17. *Aprecots* ib.
Maſculine Aprecot ib.
Orange Aprecot ib.
Turkey Aprecot ib.
Breda Aprecot 328
Chap. 18. *Of Plums* ib.
Haſtive and Mirabel Plum ib.
Drab d'Or Plum ib.
Maitre Claud Plum ib.
Blue Perdrigan Plum ib.
Royal Plum ib.
White Perdrigan Plum 329
Imperatrice Plum ib.
Catalogue of other good Plums ib.
Chap. 19. *Of Cherries the ſeveral Sorts* ib.
Chap. 20. *Of Kernel-Fruit, ſuch as Apples, Pears,* &c. *how to diſpoſe them whether for Walls, Dwarfs, or Standards, their Deſcription, Order and Time of ripening* 330
Of the Pear ib.
July Pears 331
Auguſt Pears ib.
Pears which ripen in September ib.
Pears ripe in October 332
Pears ripe in November 333
Pears ripe in December, January *and* February ib.
Chap. 21. *A Catalogue of the beſt Apples* 335
Vines that will ripen in England ib.
Chap. 22. *Of the Gooſeberry, Currant, Philbud, Raſberry and Strawberry* ib.
Of the Gooſeberry 336
Of the Currant ib.
Of the Philbud 337
Of the Raſberry ib.
Of the Strawberry ib.
Of the Berberry 338
Chap. 23. *Of the Diſeaſes of Fruit-Trees* 339
Chap. 24. *Of Blights* 342
Of Horizontal Shelters to prevent Blights 345
Chap. 25. *An Exhortation and Addreſs to the Nurſery-men, throughout the ſeveral Parts of* Great-Britain 347
Chap. 26. *Of the Differences of Climates, with the Conveniencies and Inconveniencies of Soils, Situation and Degrees of Latitude* 351

BOOK IV.

Of the Kitchen Garden 357
Chap. 1. *Of Melons, Cucumbers, Pumpions, Gourds,* &c. 358
Chap. 2. *Of Artichokes, Chardons, and Aſparagus* 363
Of Artichokes ib.
Spaniſh Chardon 364
Aſparagus ib.
Chap. 3. *Of Eſculent Roots uſeful in the Kitchen* 366
Of Carrots 367
Of Radiſh ib.
Of Parſnips ib.
Of Turneps ib.
Of Beet ib.
Of Scorzonera ib.
Of Radiſhes ib.
Of Potatoes 368
Of Jeruſalem Artichokes ib.
Of Onions ib.
Of Leeks ib.
Of Skirret ib.
Chap. 4. *Of Collyflowers, and the ſeveral Kinds of Cabbage* 369
Of Collyflowers ib.
Of Brocauly 370
Of Cabbages ib.
Chap. 5. *Of Beans, Peas, Kidney-Beans, and other Pulſe* 371
Of Beans ib.
Of Peaſe 372
Of Kidney-Beans 373
Chap. 6. *Of ſuch Herbs and Plants as are commonly uſed in Sallads with the beſt Methods of cultivating and mixing them* 374
Of Lettuce 377
Of Endive 378
Of Purſlain ib.
Of Sellery ib.
Of Fennel 379
Of Sorrel 380
Of Spinage ib.

Of Cherville ib.
Of Creſſes ib.
Of Garlick 381
Of Onions, Leeks, &c. ib.
Of Capſicum Indicum or Indian *Pepper* ib.
Of Taragon 382
Of Mint ib.
Of Baulm ib.
Of Borrage ib.
Of Bugloſs ib.
Of Cornſallad ib.
Of Mallow ib.
Of Dandelion ib.
Of Elder ib.
Of Parſley. ib.
Of Burnet 383
Of Sampier ib.
Of Scurvygraſs ib.
Of ſmall Herbs ib.
Of the Silphium of the Antients 384
The Hiſtory of the Aſa Fœtida 387
Chap. 7. *Of Pot and Aromatick Herbs* 403
Of Roſemary and Lavender ib.
Of Thyme ib.
Of Hyſop 404
Of Rhue ib.
Of Tanſie ib.
Of Savory ib.
Of Marjoram ib.
Of Penneroyal and Camomile ib.
Of Angelica ib.
Of Carduus 405
Of Baſil ib.
Chap. 8. *Of the Nature, Properties, and great Advantages of untried Earth, both in the Fruit and the Kitchen-Garden* ib.

BOOK V.

T*HE Flower-Garden* 411
Chap. 1. *Concerning the Situation and Diſpoſition of the Flower Garden* 413
Chap. 2. *Of ſuch Soils and compoſitions of Earths as are found to be in the General moſt agreeable to Flower* 414
A complete Catalogue of Flowers great and ſmall perannual or annual, uſually known or propagated in England, *either in the naked Ground or Hotbed* 418
Chap. 3. *Of perannual Flowers of the talleſt Size* 419
Of the Starflower ib.
Of the Hollyhocks ib.
Of the Sunflower ib.
Of the Everlaſting Pea 420
Of Canterbury Bells ib.
Of Foxgloves ib.
Of Lillies ib.
Of Martagons 421
Of Mulleins ib.
Of the Primroſe Tree ib.
Of the Tuberoſe ib.
Of the Cardinal Flower 422
Of Belvedere ib.
Of Comfry ib.
Chap. 4. *Of perannual Flowers of the middle Size, whether from bulbous Roots or Off-ſets* ib.
Of Moly ib.
Of Aſphodils 423
Of Peonie ib.
Of Julian ib.
Of Narciſſus or Daffodil ib.
Of Fraxinelle 424
Of Valerian ib.
Of Cyanus 425
Of Roſe Campion ib.
Of Rocke ib.
Of Monkshood ib.
Of Scarlet Lychnis ib.
Of Sweet William 426
Of Crown Imperial ib.
Of Acanthus ib.
Of Carnations ib.
Of Pinks 429
Of Stock Gilliflowers ib.
Of the Wall Flower 430
Of the French Honeyſuckle ib.
Of Hyacinth ib.
Of Collumbine 431
Of Iris ib.
Of Cornflag ib.
Of Orchis 432
Of Frittillaire ib.
Of the Globe Flower ib.
Of the Star Flower ib.
Of Geranium 433

Of Anemonie ib.
Of the Tulip 434
Of the Ranunculus 435
Of the Cyclamen 436
Of Hellebore ib.
Of the Ladies Slipper ib.
Of the Bacchusbole ib.
Of the Jonquil ib.
Of the Baſſinet 437
Of the Lilly of the Valley ib.
Of the Dogs Tooth, ib.
Of the Spiderwort ib.
Chap. 5. *Reptiles, or the loweſt vivacious Flowers* 438
Of the Auricula ib.
Of the Polianthus 439
Of the Gentionella ib.
Of the Hepatica ib.
Of the Violet ib.
Of the Crocus 440
Of the Snowdrop ib.
Of the Indian Pink ib.
Of the Panſy ib.
Of the Aconite ib.
Chap. 6. *Annual Flowers from the Seed* 441
Of the Sunflower ib.
Of the Snapdragon ib.
Of the Larkheel ib.
Of the Poppy ib.
Of the Candia Tuft 442
Of the double Marigold ib.
Of the Venus Lookinglaſs and Venus Navelwort ib.
Of the Parnaſſus ib.
Of the Catch Fly or Muſcipula ib.
Of the Flos Adonis ib.
Of the Nigella ib.
Of the Lupine ib.
Of the Scarlet Bean 443
Of the Annual Stock ib.
Of the Viola tricolor ib.
Of the Scabius ib.
Chap. 7. *Of Annuals to be ſown in Hotbeds* 444
Of the French and African Marigold ib.
Of the Amaranthus ib.
Of the Bind-weed or Convolvulus 445
Of the Marvel of Peru 446
Of the Female Balſom ib.
Of the ſweet Sultan ib.
Of the Guinea Pepper or Capſicum Indicum ib.
Of the Indian Creſs or yellow Larkſpur ib.
Of the ſenſitive Plant 447
Chap. 8. *Of the ſeveral Hindrances and Obſtructions to Improvement, and the general Annoyances to Vegetables, whether in the Field, the Foreſt, the Fruit-Garden, or the Flower Garden, with their probable Remedies* 447
Of Ant-Hills 449
Of Moles ib.
Of Furze 450
Of Broom ib.
Of Fern 451
Of Heath Ruſhes ib.
Of Thiſtles ib.
Of Couch Graſs ib.
Of Carlock ib.
Of Wild Oats 452
Of Moſs ib.
Of Rubbing of Cattle ib.
Of Rooks ib.
The Concluſion 454

ADVERTISEMENT.

NOblemens and Gentlemens Eſtates ſurvey'd, and valu'd in order to their Improvment, and Books of Maps with the Particulars drawn from the ſaid Surveys; ſhewing the ſeveral Sorts of Lands, and the Yearly value of each Parcel in the Poſſeſſion of the ſeveral Tenants, whether Tenants at Will, or upon Lives, *&c.*

By *EDWARD LAURENCE* Brother to the Author,
and
WILLIAM GARDINER.

Who may be heard of at Mr. *Woodward*'s a Bookſeller, at Mr. *Mead*'s a Goldſmith, and at *Richard*'s Coffee-Houſe, all near *Temple-Bar*, *London*; or at the Revd. Mr. *Laurence*'s Rector of *Biſhops-Weremouth* near *Sunderland*, in the Biſhoprick of *Durham.*

N. B. The ſaid Mr. *Edward Laurence* having had long Experience in Countrey Buſineſs, and the Nature of Farms, and having given full Satisfaction to a conſiderable Part of the Nobility and Gentry by his own Surveys, which have enabled him firſt to value, and then to let, or ſell their Eſtates to the beſt Advantage, and likewiſe by drawing proper Covenants to oblige their Tenants to keep up their Farms in a due Courſe of Husbandry, intends now to apply himſelf wholly to the valuing and improving part only, and to leave the Surveys to the ſaid Mr. *Gardiner*, who is fully and completely skill'd in that uſeful Art.

The ſaid Mr *Edward Laurence* intends ſhortly to publiſh a Treatiſe in Folio of his Method of delineating Maps, and drawing up the Particulars of improved Eſtates, and giving an eaſy and familiar Account of the beſt Methods of Husbandry uſed in moſt Parts of the Kingdom, together with his own Obſervations, and actual Improvements made on ſeveral Noblemens and Gentlemens Eſtates.

A NEW SYSTEM OF AGRICULTURE AND GARDENING.

BOOK I.

Of HUSBANDRY in the Field, and its ſeveral Improvements.

INTRODUCTION.

AIR, *Earth*, *Fire* and *Water*, being known to have their Effects, and various Influences in Husbandry; and, if made to exert their natural Properties in a due manner, and regular proportion, to contribute greatly to the Improvement of Land; it may be expected that I ſhould take ſome particular Notice of them in a Philoſophical manner; and yet ſo, as with a View always of bringing *Theory* down to *Practice*.

CHAP. I.

Of AIR.

BY the *Air*, is commonly underſtood that Fluid wherein we live and breathe, and which covers the Earth to a conſiderable Height in a different Denſity. But this is more properly called the *Atmoſphere*; which is a compound Maſs made up of light and fine Atoms, or ſmall Parts, ſuch as are the *Effluvia*, or Steams of all ſorts of Matter, *viz.* Water, Smoke, Plants, Animals, Nitre, &c. But the much greater Part thereof is a pure and native Subſtance of its own kind, which we call *Air*.

Air is a diaphanous fluid Subſtance, whoſe Parts mutually avoid each other, and by means of that Avoidance become *Elaſtic*. Whether this mutual Avoidance ariſes from a Law of the Fluid it ſelf, or from its being attracted ſtronger by the *Fluid of Fire*, of which ſome curious Naturaliſts of late ſpeak, than the Parts are by each other, is not eaſy to determine. The Parts of Salts mutually *attract* each other till put into Water, and then they mutually *avoid* each other, diſperſing all over the diſſolving Fluid; and it is certain, that Heat will greatly encreaſe the Elaſticity of *Air*. The *Air* is alſo *compreſſible* and *dilatable*; for the lower Parts thereof are always more compreſſed than thoſe above, and reciprocally proportional to its Compreſſion, its neareſt Particles receding from each other with Forces reciprocally proportional to the Diſtances of their Centers.

It is alſo to be obſerved, that the *Weight* of the *Air* is different in different Parts of the Year, and in different Seaſons of the Weather; altho' Heat and Cold make no greater alteration than this, *viz.* 'Tis ſcarcely ever leſs than 800 Times ſpecifically lighter than Water, and in its natural State ſeldom more than 1000 Times; tho' in Condenſers it may be compreſſed to a much greater Degree, and by Heat and an Air-Pump expanded to a ſurpriſing Rareneſs.

But becauſe the Nature and Properties of the *Air* are either not generally well underſtood, ſometimes darkly explained, and ſeldom ſet in a clear Light; all Philoſophical Perſons will expect ſomething new of this Kind, from one that engages to give an intelligible Syſtem of Vegetable Nature. And I own, I the rather take upon me the Part of the Philoſopher, as well as the experienced Husbandman; becauſe I acknowledge my ſelf to have been greatly aſſiſted by the Converſation and Correſpondence I have had on this Subject with ſome ingenious and learned Friends.

Having ſaid that *Air* is an Elaſtic Fluid, which ſurrounds the whole Earth, it is but neceſſary that this be ſaid further here alſo; that by an *Elaſtic Fluid*, is meant a Fluid whoſe Parts mutually avoid each other, from what Cauſe ſoever that mutual Avoidance comes. For,

The Conſequence of this Property of the *Air* is, that its Denſity (as was hinted before) will be in proportion to its Compreſſion, and that the higher you aſcend, the thinner is the *Air*. Hence it follows, that was the Atmoſphere of much *leſs* Altitude than it is at preſent, or of much *greater*, neither Plants nor Animals could ſubſiſt, at leaſt not *ſo well*, as they do at preſent. Had it been of much *leſs* Altitude, then the Air we breathe would have been proportionably *thinner*, and leſs fit for Reſpiration; for 'tis generally obſerved, that at the Top of very high Mountains, (ſuch as the Pike of *Tenariff*, which may be near three Miles perpendicular Height,) Animals reſpire with difficulty. Had the Altitude of the *Air* been *conſiderably leſs*, we ſhould feel much greater difficulty ſtill.

Beſides, we find that the *preſent Denſity* can only bring up Vapours to the Height of Hills, and Tops of Mountains, where they continually hang till they diſſolve in Rain, and ſo run into and form Springs: So that if *Air* was on the Surface or horizontal Plane but even as light as now it is on the higheſt Mountains, we ſhould live in a perpetual Fog, and both Men and Vegetables be deſtroyed for want of free Perſpiration; for Vegetables muſt perſpire alſo, or they ſtarve. By Dr. *Woodward*'s Experiments, it appears that daily many hundred times as much Water as the Quantity of the Augment is carried thro' the Veſſels; and when thoſe Juices come to the perſpiratory Orifices, if the *Air* was not of a proportionable Weight to buoy up and carry off the watry Excrement, it would there ſtagnate, and by the Veſſel's being already full, prevent new Juices from aſcending; and conſequently, prevent all Nouriſhment from ariſing in the Tubes.

'Tis poſſible indeed, that ſome few ſorts of Plants may have Perſpiration fine enough to be carried off by *Mountain-Air*, as the Fir-Kind, and ſome other Plants, which delight in Hills; but all the other Varieties would be loſt by a much lower, and conſequently *thinner* Atmoſphere.

Thus therefore it is ſeen a *certain* proportionable Quantity of *Air* is neceſſary to Vegetation, to ſupport Vapours, to carry off vegetable Perſpiration, and by Winds to agitate and ſhake the Trees, to hinder the *Secretory Glands* (if I may uſe that Metaphor) from being obſtructed. This will ſerve to explain the odd Phænomenon of the *Fountain-Tree* in the Iſland *Fero*, which drops ſuch Quantities of Water. It differs only from other Plants, as a Man who perſpires freely doth from one who ſweats profuſely; the Orifices of his Veſſels are ſo large, that the Particles which exſude are too heavy to be carried off. Theſe therefore run into each other on the ſmooth Leaf, and form there Drops which fall and refreſh the Earth.

Thus in our Country, the *Ros Solis* hath its Leaves in the hotteſt Weather ſurcharged with a very large Drop of Water, which it conſtantly fills faſter than the Sun can drink it up. Hence alſo follows the Reaſon why Wood-land Countries are ſo damp and aguiſh; for if the Perſpiration of Vegetables be *ſo great*, no wonder that the *Air* is *ſo moiſt*. And this, by the way, may ſerve as a right and ſeaſonable Caution to all Gentlemen who value their Healths, not to be too buſy and profuſe in the Ornaments of Planting, as they commonly are, eſpecially too near their Houſes: But yet, at the ſame time, another Hint may be taken from hence, that ſome Trees may by their Quality and Quantity of Perſpiration make the *Air Medicinal*. The Turpentine Kind throws off a large Quantity of warm active Particles, and probably would much contribute to the Salubrity of a Gentleman's Seat. For that the Sweat of thoſe Plants is warm, may be collected thus: That in great Numbers *cloſely* growing, they cheriſh and defend each other againſt the Cold of the bleakeſt Climates; while *ſingle*, they grow ſtunted in very temperate and ſheltered ones.

This is ſufficient to ſhew the Inconveniencies which would follow, ſuppoſing the Atmoſphere *leſs high*. And yet it is as eaſy to ſhew, that not fewer would ariſe, if the Atmoſphere was *conſiderably higher*: For in that Caſe, the Compreſſion of the *Air* on the Earth's Surface would be greater, and conſequently the *Air denſer*. 'Tis true, we might *breathe* as well in ſuch a compreſs'd Air; as is proved by the Gentlemen who have continued long in diving Bells, and by Animals which have ſhewn no Uneaſineſs in *Condenſers*: But in every other reſpect, the Change would be fatal; for, firſt, the Vapours would be carried up to ſo great an Height, that they would not deſcend in Rain, unleſs it be when Storms conſiderably altered the Denſity below: Dews would never fall: The Clouds would be carried up ſo much higher than the Tops of Mountains, that the Vapours would not be ſtopped by them, and condenſe there, and return in Streams to the Sea. And thus the Face of the Earth, in great meaſure, would ceaſe to be refreſhed with Water; at leaſt, it would not be nouriſhed with that regular and gentle Moiſture it rejoyceth in at preſent; tho' now and then the Flood-Gates of Heaven might be opened, and the * *Waters above the Firmament* be poured down in Cataracts to *deſtroy* rather than to *bleſs* the Fruits of the Earth.

Beſides, had the Denſity of the lower *Air* been *conſiderably greater*, on every Storm, nothing could have withſtood its Force, the *Momenta* of Bodies being as their Quantities of Matter multiplied by the Motion. Thus wiſely hath the Author of Nature choſen *that only Denſity* of our *Air* and Height of our Atmoſphere, which was relative to our Neceſſities, and the Nature of Animals, Plants, and Water. And thus both the Chriſtian and the Philoſopher may behold, with an Heart opening with Gratitude, that there is a *Meliority* obſervable in every Thing.

I have taken notice, that one Neceſſity why the *Air* ſhould not be much denſer, was, that Vapours ſhould not aſcend above the Brows of Hills, becauſe by that means Fountains would have been prevented; for the Origine of Springs chiefly ariſes from thoſe. It is well known, by Dr. *Halley*'s Experiments, that Vapours ariſe in proportion, not to the *Depth*, but to the *Surface* of Waters. 'Tis known, that all the Rivers running into the Sea, never increaſe its Bounds; for if it gets in one Place, it loſes as much in another. And again, it is not leſs well known, that the Winds from the Sea bring us our Rains. If therefore we have not *too much* Rain and Dew; if not *too many* Springs and Rivers, as every one confeſſes we have not; then the Quantity of Sea on our Earth is but in ſuch a proportion, as is neceſſary to make the dry Land fruitful and habitable: And we ſee, that what is brought from thence, and returned thither, doth but juſt keep the Balance *even*

The next Obſervation that offers it ſelf to be made on *Air*, is, that its Quantity continually, in ſome ſmall degree, *increaſes* and *decreaſes*: Inaſmuch as no Fermentation whatever but looſens from Bodies ſome Particles, which have a mutual Avoidance, and become therefore *Air*. Put any Fruit, or Bread, or dead Animal, in an exhauſted Receiver, and in a few Days, by corrupting, they will fill it again with a vaſt Quantity of *Air*; which could not be, if the corrupted Effluvia were not turned to *Air:* But yet it is an *Air* ſo noxious and imperfect, that if by a Transferrer 'tis thrown on any Place where a Bird is confined, it immediately falls into Convulſions, and expires. Not unlike the manner by which Dogs are deſtroyed in the *Grotta del Cani* * in *Italy*. Again, If a few Particles of Gun-powder are fired in an emptied *Air-Pump*, when the *Quickſilver Gage* is riſen to the Height of the Barometer, it immediately *ſinks*, as if the whole Atmoſphere was re-admitted. If two Oils, which burſt into Flames when mingled, are put together in an exhauſted *Receiver*, they not only *generate Air* enough to ſink the *Gage*, but to burſt the *Receiver* with incredible Violence.

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* Gen. i. 31.

Thus every Fermentation ſhakes off Particles of *Air* from the Bodies to which they were united. But as *Air* thus continually *increaſes*, it alſo as continually *decreaſes:* For as it conſtantly aſcends in the Tubes of Plants, great Part of it remains there, plumping up the Fruit, and filling the Veſſels, as well as Water: And tho' the Parts of *Air* avoid each other, they ſtill unite with all other Bodies.

Hence therefore may be learnt, that *Air* is in ordinary Caſes uſeful to Vegetation, to carry up the Juices, to open and ſupport the Veſſels againſt the Preſſure of external *Air*, and to ſwell the Fruit; but it may be alſo *uſeful* to the ſame purpoſe, by mingling great Quantities of *Air* with the Soil, to repleniſh it with what is ſo neceſſary for the Growth of Plants. Theſe Hints are ſufficient to put others upon enlarging on ſuch Particulars.

I paſs on to another Property of the *Air*, *viz.* It's being capable of a ſurpriſing *Rarefaction.* Mr. *Boyle* hath ſhewn by Experiments, that it may be *thinned* 14000 times more than what it is on the Earth's Surface, even *without* Heat, but vaſtly more *with* it. Dr. *Halley* has calculated how high our Atmoſphere is by the Duration of the Twy-light; but that Calculation only proves, that the *Air* is not ſtrong enough beyond that Height to reflect and act on Light, tho' it may ſtill be of conſiderable Strength and Force. Thus in the Water-Bubble, which Boys blow up with Soap; the Skin of Water becomes at laſt on the Top ſo *thin*, that it can reflect no Light, and looks therefore *black*; but ſtill 'tis a *Skin* of Water.

The *Air* may alſo be many Miles higher than that Part of it which hath Force to bend a *Ray*. The *Ball* of Light, which a few Years ſince ſurpriſed at once ſo many diſtant Countries, proves, that ſulphureous and acid Vapours to ferment with them, could be ſuſpended ſeveral Miles higher, than that Part of our Atmoſphere which cauſes *Twy-light:* And indeed from this great Power of *Dilatation*, part of its Activity in Vegetation ariſes. When by internal and external Heat it expands itſelf, it *aſcends*; and by *aſcending*, carries with it the ſurrounding Films of Water, ſaturated with vegetable Salts, (& *qua data porta ruit*) enters into every open Orifice, and conſequently into all the *ſubterraneous* Pores of Vegetables.

The next Thing I ſhall take notice of is, not what is properly a Quality of the *Air*, but of *what it contains*; but yet is the principal Thing, by which it becomes a *Manure*; and that is, an *acid Spirit*, with which it is plentifully repleted, and by which it performs many of its moſt ſurpriſing Effects. 'Tis this which corrodes *Iron*, and turns it into *Ruſt*. 'Tis this which corrodes *Braſs* and *Copper*, and turns them into that Ruſt, which is called *Verdegreaſe*. 'Tis this which, uniting it ſelf with the Salt of Lime, forms a *Nitre*. Diſtil from *Vitriol* all the Oil you can, expoſe the Remainder for ſome time to the *Air*, and it will thereby be ſo repleted by this acid Spirit, that it will render it able to yield plentifully on a ſecond Diſtillation. 'Tis this *acid Spirit*, which twitches the Stomachs of thoſe who continue long in a free *Air*, and gives them the pleaſing Senſation called *Hunger*; which *City-Air* (where this *Spirit* is blunted by Smoke, groſs Perſpirations, and Stagnating,) is not able to beſtow. 'Tis this which feeds *Flame*; for when 'tis *blown* upon the minuteſt Fire conſtantly, it makes it *burn* with Fierceneſs.

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* See MEDE, Of Poiſons.

This alſo accounts for that odd Appearance of *Sun-ſhine putting out Fire:* The Heat of the Sun ſublimes and draws away a great part of this *acid Spirit*, which was neceſſary to nouriſh the Fire. Nigh to a Fire there is always a *Rarefaction*, which makes the freſh cool *Air* flow in, and bring with it *that Spirit*; but when the Sun ſhines, the *Rarefaction* is nearly equal all over the Room, and conſequently no ſuch Current or freſh Supply near the Fire, which was ſo neceſſary to keep up its Vigour.

'Tis this *acid Spirit*, which, fermenting with ſulphureous Steams, cauſes all the Thunders, and Lightnings, and other fiery Meteors. This therefore, when the Soil is turned up, joins and ferments with the Sulphur and Salts of the Earth, whereby it becomes a kind of Nitre, that mellows and relaxes the Soil, thereby permitting the fattening Dews to penetrate and enrich it.

The great Quantity of this *acid Spirit* (whoſe volatile Particles are endued with a violent attractive Power, which they exert towards every thing; and therefore makes them capable of uniting with, and ruſhing to, and conſequently agitating every thing;) This *acid Spirit*, I ſay, which pervades all our Earth, and performs the greateſt Wonders which we admire and gaze at, is a Principle in Philoſophy, which till of late was neglected, tho' of univerſal Importance to Mankind. The Attractions of *Gravitation*, of *Magnetiſm*, of *Electricity*, exert their Effects at ſuch great Diſtances, as to fall under every one's Obſervation: But this different amazingly powerful Attraction of the *Acid*, exerting it ſelf only at minute Diſtances, was not known, till *Experimental Philoſophy*, reaſon'd on by Sir *Iſaac Newton*, diſcovered it. The efficient Cauſe of this is perhaps as yet unknown; as likewiſe of *Gravity*, of *Magnetiſm*, of *Elaſticity*, of *Electricity*, of *reflecting* and *refracting* Light. But the *Facts* are indiſputably proved; their Laws are diſcovered and diſcovering; their Conſequences obſerved, and to be regarded; and poſſibly theſe hereafter may lead to the Knowledge of the *efficient Cauſe*. But if *this* cannot guide us thither, *nothing* can. Tho' perhaps this Knowledge we have is as far as our Capacities are made to arrive, or our Neceſſities want to carry us.

There remains yet one other Property of the *Air* to be conſidered, and that is, *its Weight*. And the *Whole* of this is found to be equal to about a Cylinder of near 35 Foot of *Water*, whoſe Baſe is the Superficies of the Earth. The Preſſures of Fluids are every way equal. Every thing is therefore preſſed by the *Air Horizontally* as well as *Perpendicularly*.

cularly. When this Weight is agitated by Winds, how muſt it ſqueeze and break and moulder the Clods of Earth? How muſt it ſqueeze the Sides of Plants, and force out the Juices at every Pore? Was it not for the Quantity of *Air* within the Veſſels to reſiſt its Force, all the tender Plants would be flatted as thin as Paper.

To calculate the Preſſure on a Tree a little. Every ſquare Foot ſuſtains a Weight equal to 35 cubical Feet of Water, as before obſerved. Every cubical Foot of Water weighs 76 Pound, *Troy* Weight; therefore every ſquare Foot of any Body on its Horizontal Plane ſuſtains a Quantity of *Air* which weighs 2660 Pounds. Every Tree therefore of 12 Inches Diameter, and ſuppoſe 20 Foot high, will be preſſed by a Weight of 160000 Pounds. The different Preſſure which ſuch a Tree would receive from different States of the *Air* would be more than that of 10000 Pounds, ſuppoſing both at reſt. But from either in Motion, the *Momentum* muſt be often much more different.

This happens, tho' our *Air* is (as I have already obſerved) more than 800 Times rarer than Water. But had our Atmoſphere been *higher*, this amazing Weight would have been ſtill *greater*. And how, think you, muſt Plants be affected by ſuch a Force? How muſt Clods of Earth, expoſed to it, loſe their Coheſion, and be cruſhed? How muſt Diſſolution be aſſiſted by ſuch a ſurpriſing Power? Its Weight, its Rarefaction and Condenſation, its Elaſticity, the acid Spirit it contains, and the Vapours it ſupports, carrying from Place to Place all the finer Materials fit for Vegetation. All and every one of theſe, tend to ſhew how conſiderable a Share the *Air* hath in that truly divine Contrivance, of handing down with undiminiſhed Beauty the Furniture, which at preſent is of Ornament and Uſe to the Globe, through the lateſt Generations.

Were it not that I ſhould be accounted tedious in this *Chapter*, there might be ſuggeſted many Meditations on the abſtruſeſt Parts of Vegetable Philoſophy, as *clear* and *evident* as they are *uncommon* and *unknown*, ſufficient to remove Difficulties that perplex the Minds of Enquirers, and make the Wiſdom and Contrivance of the great efficient Cauſe, the grand Parent of the Univerſe, the mighty God and Lord of all Things, who is the Object of our Worſhip and Praiſe, to be the Object alſo of our greater Admiration and Love!

The Uſe and Neceſſity of *Air* towards preſerving the Life, and forwarding the Encreaſe of Vegetables, being plain and obvious by every Day's Experience; I ſhall only mention one familiar Fact of Mr. *Ray*'s, mentioned in *Phil. Tranſ.* No. 23. who ſaith, " That Lettuce Seed being " ſown upon ſome Earth in the open Air, and ſome of the ſame Seed at " the ſame Time upon other Earth in a Glaſs Receiver of the Air-Pump, " afterward exhauſted and cleared of all Air: The Seed that was expoſed " to the Air was grown an Inch and a half in eight Days Time; but *That* " in the exhauſted Veſſel or Receiver that was cleared of Air, grew not " at all: But the Air being afterward let into the empty Receiver, the " Seed in the Space of one Week grew up to the Height of two or three " Inches.

From hence may be gathered the Neceſſity of *Air* for the Birth, as well as the Continuance of Life and Motion of Vegetables; and that the probable Cauſe of Both is from *Action* and *Re-action*. The Trunk of a Tree or Plant, is no other than a Canal made up of leſſer Pipes, through which the Juices are driven by Heat toward the Top, and by the outward

Preſſure of the Atmoſphere are forced from a larger to a narrower Space. And that the Juices, when forced up, may not fall down again, there are Valves in thoſe Pipes to prevent them from returning the ſame Way; but when they have arrived at the Top, they return by other Veſſels, which may be called Veins. And thus Circulation is performed.

Tho' I am far from being of Mr. *Bradley*'s or his Correſpondent's Opinion, with reſpect to the Uſe of *Earth* in the Buſineſs of Vegetation, viz. *That its chief Uſe is to keep a Tree or Plant ſteddy*; becauſe Dr. *Woodward*'s Experiments (as ſhall be ſeen preſently) directly prove the contrary: yet I am ſo far convinced of the Neceſſity and Uſe of *Air* for Vegetation, that, by Experiments of my own, I find ſeveral Sorts of *Sedums*, and ſome bulbous rooted Plants, will encreaſe both in their Roots and Branches as they are hung up in the open Air, without the Help of ſolid Earth to ſtand in. This only proves the Uſe and Advantage of Air for the Life of Plants; but not *negatively* againſt the Neceſſity alſo of earthy Particles, of which the Air, and chiefly the lower Part of the Atmoſphere, are always full. And accordingly, the *Sedums* are ever obſerved to grow and flouriſh moſt, when the Air thickens and tends to Rain, or in Miſts and Fogs; when, by all Experiments, it is found the Air is fulleſt of terreſtrial Matter.

I cannot but think it very probable that the bulbous Roots of Turnips, which arrive to ſo great a Bulk from ſo ſmall a Seed, and are obſerved to give ſuch Riches and Fatneſs to Land, receive the greateſt Part of their Nouriſhment and Augment from the fattening Moiſture of the Air thro' the Pores of their Leaves and Rind: Inaſmuch as 'tis amazing into how ſmall Veſſels Water will inſinuate its Particles. For this Purpoſe,

Take a Whip-Cord faſtened to an Iron Hook; at the other End hang any Weight of what Magnitude you pleaſe leſs than will break it; then wet the Cord with a Sponge, and you'll find the ſuſpended Force overcome, and the Weight raiſed, by the Water inſinuating itſelf into the dry Tubes of the vegetable Subſtance; and by being there, dilating them *laterally*, and conſequently ſhortning the Perpendicular.

The Globules of Water muſt be conſidered as *Wedges*; the horizontal Preſſure of the Air as the *Force* acting on the Wedges. The Power of Wedges to enter any Body, is known to encreaſe in ſmall Angles, nearly as the Angle decreaſes in a reciprocal Proportion; that is, in this Caſe, as the Smallneſs of the Diameters of the little Spheres of the Water. *Air* will not enter where Water meets no Reſiſtance, either becauſe the Particles of the One are much ſmaller than thoſe of the Other, or that their mutual Avoidance prevents their confining themſelves together in an extremely narrow Paſſage.

If a Cord ſuſpended a Weight equal or ſuperior to a Cylinder of Air, whoſe Baſe was equal to the ſquare Inches of the Surface of the Cord, I ſhould doubt whether 'twould be poſſible for Water to be forced into and dilate the Tubes it is compoſed of: Nor does the famous Story of the *Antonine Pillar*'s being brought into its Place by a Shower of Rain, when Engines could perform no more, and the Workmen deſpaired of accompliſhing their Undertaking, prove the contrary; for the Multitude of Cables which muſt have been then employed about erecting that monſtrous Stone, may be eaſily imagined to ſuſtain an Atmoſphere of Air of greater Weight than that huge Stone, and therefore would drive the watry Wedges into the Pores, and by extending them *laterally* ſhortened the Cords, and performed the Buſineſs to the Amazement of the Vulgar, who preſently cry'd out, A *Miracle*, a *Miracle!*

Thus we ſee even Deal Boards ſwell with Moiſture. And if when dead and dry, and their Tubes contracted, Vegetables can ſuck in Water; when growing, why may they not likewiſe ſwell, and when their Pipes are tender, open and dilatable, receive Nouriſhment often that Way alſo? And this may give a rational Account how ſome Plants may ſwell to an aſtoniſhing Size without robbing the Earth of much of its Treaſures, and yet at the ſame time, either by rotting on the Soil, or by paſſing thro' the Bodies of Animals, *give* Riches which they never *received* from the Earth.

Perhaps bulbous Plants may be formed ſo, as to do it in an extraordinary manner, and have large Veſſels conveying down Juices: Whilſt others may have Veſſels ſo formed, ſomething analagous to Valves, which would hinder any thing from entering, tho' it gives free Power to all from within to diſcharge it ſelf.

Sir *Iſaac Newton* defines *Water* (when pure) to be a *fluid Salt*, volatile, and void of Savour. And (if it would not be anticipating what I have to ſay on that Head) I would add, that it probably conſiſts of ſmall, ſmooth, hard and porous Spheres, of equal Diameters, and of equal ſpecific Gravities. Their being *Spheres* lets them touch only in one Point, and ſo the Attraction is not very ſtrong between themſelves. Their *Smoothneſs* gives them Power of ſliding eaſily over each other in obedience to every Preſſure, (which is Fluidity.) By theſe two, their Friction in ſliding on each other is almoſt Nothing. Their *Hardneſs* ſhews a Reaſon why, when free from Air or undilated by Heat, they are incompreſſible Their *Porouſneſs* explains why 'tis of ſo ſmall a ſpecific Gravity. Their *Roundneſs* fits them to be lapp'd about by every thing which is flexible, and to carry it where it goes. The various Flavours and Quality of Water ariſe from the Mixtures, with which it is ſaturated. All Liquors are more or leſs fluid, as there is a greater or leſs mixture of other Bodies with watry ones. *Spirits* ſeem to be *Sulphur* wrapped round the Globes of Water, and intimately united with them in ſuch a manner as to keep their Particles at a greater Diſtance than before, to leſſen its Gravity without deſtroying the Fluidity. They ſeem ſo cloſely united, that when Fire acts on the Sulphur, it carries up the Particle it had ſeized along with it.

I have ſaid this *here*, the rather, that ſome intelligible Ideas may be formed how Air, and Water with its terreſtrial Matter, may be ſuppoſed to operate together in the Buſineſs of Vegetation.

But that I may, from what hath been ſaid in a Philoſophical manner of the Nature and Properties of *Air*, proceed to ſomething practical and uſeful to all Lovers of Improvement in Vegetables, it may not be amiſs to ſay ſomething here of the different Effects of *Air* in its ſeveral different States.

What we call a *warm* Air, is made ſo originally from a due and regular Influence of the *Sun* immediately; or *conſequentially* ſo, from its driving Motion out of *hotter* Countries and Climates into *colder*. And this *moderate* warm Temper of the Air is what is ſo deſireable, that it gives Life, and Strength, and Motion, to the Vegetable Kingdom: And conſequently the *Extremes* are very hurtful, either ſcorching up the Sap and natural Moiſture of Plants and Trees, or elſe chilling and ſtarving their Juices and Pores by exceſſive Cold; even ſometimes, and in ſome Plants, to a degree of perfect *Stagnation*, which is *Death*.

But yet it is to be obſerved, that for the avoiding the dangerous Effects of theſe two Extremes, there are even in the Air it ſelf certain Diſpoſitions and Qualities, which deſerve to be taken notice of with Thankfulneſs. That is to ſay; In all the hot *Iſland Countries*, there are obſerved to blow at certain Times cool and refreſhing Breezes, coming over Land from the more Northern Parts. And it is found by Experience, that a cold Air doth not ſo ſoon loſe its cold Quality coming over Land, as when coming over the Sea. So on the contrary, it is found that the Salt Particles of the Sea Water mixing themſelves with the Air, do greatly hinder and prevent any Intenſeneſs of Cold in ſuch Countries as lie near the Sea, or from ſuch Winds as come acroſs it. Inſomuch, that we ſeldom find that either Snow or Froſt will abide long even in the Latitude of 55. And moreover, I have made it my Obſervation, that it is much eaſier to *winter* any tender Plant even in that Latitude near the Sea, tolerably ſheltered, than in the more Southern Inland Parts of *Northamptonſhire*: Which can be attributed to nothing elſe, but to the conſtant warmer Temper of the Air (in the Abſence of the Sun) impregnated with Saline, nitrous, and conſequently warmer Particles.

This Head of Diſcourſe would naturally lead me to treat of ſome other fatal Effects of a *diſtempered Air*, accidentally very noxious, and many times fatal to all Sorts of Vegetables; ſuch as ſcorching Winds, cold Dews, and Blights. But foraſmuch as I intend to be a little more particular in my Directions againſt their Malignity and Influence, when I come to treat of the *Fruit-Garden*, I ſhall reſerve what is to be ſaid on this Point to a Chapter by it ſelf.

CHAP. II.

Of EARTH.

THIS Globe of *Earth*, on the Surface of which we live, and for which ſo many unreaſonably ſtrive, is compounded of many heterogeneous Particles and ſorts of Matter ; all or moſt of them uſeful, or may be made ſo, for the Purpoſes of Vegetation: And indeed without them, no Sort of Tree or Plant will continue or proſper long.

According to Mr. *Evelyn*, the various Sorts of *Earth* every where to be met with are almoſt innumerable ; eſpecially if we include the different Colours, Weights, and Conſiſtencies of the ſeveral Soils. However I cannot but think, allowing ſomething to ſmaller Variations in Colour and Richneſs, that all the different Sorts of *Earth* may be reduced to theſe three, *viz. Loam*, *Sand*, and *Clay*. For tho' there are many other Sorts, that bear other and different Names, yet they are all of them in ſome reſpect or other depending upon theſe ; and which is more, one or other of Theſe do every where prevail, and all of them have Parts proper for Vegetation, tho' in different Degrees and Proportions. For it muſt not be denied, that all the Sorts of Gravels, till you come to *Loam* it ſelf or *Clay*, are of the *Sandy* Race : And all thoſe binding Earths, which in any ſort reſemble *Chalk*, or *Clay*, or *Marle*, may be reckoned of the *Clay-kind*. The due Mixture of Clay and Sand is the Foundation of Riches in Husbandry, becauſe either Extremes are worſt. And this it is which makes *Loam* preferable to all others in its natural State, as generally conſiſting of a due proportion of Both. And whether this *Mother Earth*, or *Loam*, be of a black or yellow or any other Colour, it matters not ; for Experience ſhews that Plants of all Sorts will grow in it, as being beſt endued and moſt plentifully furniſhed with ſuch proper minute terreſtrial Matter as is fit to enter the Pores of Plants for their continual and gradual Encreaſe.

It is not to be much wondered at, that there are yet ſome Naturaliſts left, who hold that Vegetation proceeds all from *Water* ; becauſe ſome upon their own Experience have affirmed, that 18 Parts of Water out of 20 have been turned into Earth only by a repeated Diſtillation ; but this rather proves that there is alway Plenty of terreſtrial Matter in Water, ſufficient to ſupply and augment the Plant, altho' the Manner of its Preparation for that Uſe be not ſo eaſy to be explained and determined.

It is the Opinion of ſome learned Men, that what we commonly call *Earth*, if ſeparated from Water and the Parts of Animals and Vegetables, is nothing elſe but Sand, *i. e.* Stones ; for I take Sand to be nothing elſe but ſmall Stones or Pebbles. But it is not eaſy to give into this Opinion ; becauſe neither by the naked Eye, nor the Eye aſſiſted by a Microſcope, can be diſcovered any Likeneſs between the Sand taken out of Clay , and the other Matter that is left, properly enough called *Clay* ; the one being gliſtering and nothing like it ; the Sand ſticking, as the heavieſt Body, to the Bottom of the Clay, when diſſolved in Water, being eaſily rubb'd off, whilſt the other by rubbing tends only to a Poliſh.

Altho' therefore *Sand* be a very neceſſary Part towards making of *Earth* fit to perform the Office of Vegetation ; yet it muſt be in its due proportion according to the Nature of the Plant it bears, and muſt have another Matter with it ſomething like to Glew to keep the Sand ſeparate, as well as the minute terreſtrial Food of the Plant (and ſuch are all extracted Dungs from Vegetables and Animals) from preſently ſinking away from it. Some Plants require a lighter, ſome a cloſer Mould, according to the different Demands of Moiſture. The right Knowledge of this Mixture would anſwer all the Ends of Enquiry, and reward us with Pleaſure and Profit.

If a Clay mixt with Sand, which is an artificial Loam, be found out, that will bear any Sort of Grain we deſire ; it ſeems reaſonable to think, that there is no Sort of natural Soil, bearing too much upon either Extremes, but may be made by diſcreet Mixtures fit for the ſame Purpoſes. And if the manner of Vegetation be pretty well underſtood, (as of late it ſeems to be ;) and if at the ſame time the proper Dung or *Menſtruum* for Plants can be alſo found ; then I ſhould think Husbandry and Gardening may be brought to the Rules of Art : And the Practice of thoſe Rules may prove as pleaſant and as profitable, as a great many other Philoſophical Arts reduced to practice are found to be.

Without queſtion, *Earth*, eſpecially if freſh, untried or new turned, hath a certain Magnetiſm, by which it attracts the Nitre and Virtue of the Air and Dews, which give it Life and Motion ; and tho' it is not always underſtood, is the Logic and Reaſon of all that Labour and Stir we keep about it in Tilling, to ſuſtain us by its Encreaſe and Products.

It will not be neceſſary to dwell any longer upon this Head, or to point out the different Kinds of Earth, good and bad, as they may be diſtinguiſhed by their Colours, Smell, or Texture. This will be ſufficiently and occaſionally done, when I come to treat about Improvements. There is hardly any ſo bad toward the Surface, but what by Art and Induſtry may be made to anſwer the Labour and Charge beſtowed. But I cannot forbear ſaying here, that the beſt, the ſweeteſt and the richeſt Kind for all Uſes, but eſpecially for the occaſional Purpoſes of a Garden, is what I have ſo ſtrongly repeated and adviſed, *viz. Untry'd Virgin Earth.* This is an Improvement wholly unknown to the Antients, and till of late a Stranger to the Moderns. And as I have had my ſelf the Pleaſure to introduce it into the Garden, it is a great Satisfaction to me, to find the Excellence of it confirmed daily by the Experience of Others coinciding with that of my own.

Mr. *Chomel*, after he had added an Hypotheſis of his own, as if a great part of the Goodneſs of *Virgin Earth* was owing to its being *carried* from one Place to another, is forced at laſt to confeſs, " That *freſh* " or *untried Earth*, is an Improvement newly introduced into Gardens, " and in all appearance unknown to antient Agriculture ; not even *Virgil* " in his *Georgics* taking any notice thereof: However, in our Time we " cannot practiſe the Uſe of it too much ; for it is certain that theſe

" new Earths had not only their primitive Salt imparted to them at the " Inſtant of the Creation; but alſo moſt part of that contained in the " Surface of the Earth which ſinks downward, is conveyed thither by " means of Water, whoſe Weight made it ſink down as far as it was " able to penetrate. This Salt preſerves it ſelf in thoſe concealed Earths, " till coming to be a Superficies itſelf, the Air gives it a Diſpoſition " proper, it ſeems, to employ with Succeſs the Fertility wherewith it is " endued. Indeed, they are not ſo ſoon at liberty to act, as to produce " Vegetables of a ſurpriſing Beauty.

I ſhall not ſay any thing further here of its Excellence and Uſes, having reſerved that Matter to a *Chapter* by it ſelf.

CHAP. III.

Of FIRE.

HAVING already given an Account of ſome of the moſt remarkable Effects of *Air* and *Earth*; ſuch as I preſume may be uſeful to the Knowledge of moſt natural Operations, and particularly the Knowledge of Husbandry; I come now to ſay ſomething of the Nature of *Fire* and *Heat*, and of their wonderful and ſurpriſing Effects.

Fire, or *Heat* which is a Degree of *Fire*, conſiſts chiefly in the local Motion of the ſmall Parts of a Body mechanically modified by certain Conditions, of which the Principal is the vehement and various Agitations of the ſmall inſenſible Parts, and that *quaquaverſùm*. For that the *progreſſive* Velocity of a Body will not be ſufficient to create *Heat* or *Fire*, is plainly ſeen from the Motion of *Air* and *Water*, which do not grow any thing the hotter for being driven on with Violence by Storms and Floods.

The Operation of *Fire* upon our Senſes, the Reſult whereof is called *Heat*, is to be eſtimated by the Relation it bears to the Organs of *Feeling*. For no Sort of *Body* is accounted *hot*, unleſs the Motion of its ſmall Parts be rapid enough to increaſe or ſurpaſs the Particles of the *Sentient*, *i. e.* the Perſon or Part that feels it. If it be more quick in the *Object* than the *Sentient*, that Body is ſaid to be *hot*; and if it be more languid than the *Sentient*, we ſay it is *cold*. This is plain by Experience; becauſe the ſame Water is frequently ſaid to be *hot* or *cold*, as the Hand that is put into it is *hotter* or *colder*.

To the Production of Heat it is requiſite, not only that the ſmall Parts be rapidly agitated, even in a much greater degree than is neceſſary to produce *Fluidity*; but alſo that the Particles thus variouſly and vehemently agitated be ſo *ſmall*, as, generally ſpeaking, to be ſingly inſenſible. For unleſs they are exceeding fine and ſubtile, they cannot readily penetrate the Pores of neighbouring Bodies, ſo as to warm or burn them. The Intenſeneſs of Heat (and the ſame is true of Light) is *cæteris paribus*, always as the Denſity of the Rays or Particles of Fire which occaſion it; and that Denſity is as the Square of the Diſtance from the radiating Point reciprocally.

But it may not perhaps be unacceptable to the Reader, to be a little more particular on *Fire*; and to obſerve that *Heat* may be ſuppoſed to be a Senſation excited by the Vibrations of a minute Fluid, *ſui generis*, which pervades all Bodies freely. For *Fire* in a Body ſeems to be nothing but the Action of theſe Vibrations on the Subſtances we behold. So *Smoke* are the Fumes ſeparated from any Body by the Action of theſe Vibrations. *Flame* alſo is Smoke heated *red hot*, *i. e.* agitated violently enough to emit *Light*: And ſo it follows, that whatſoever *attrites* a Body ſufficiently to excite Vibrations in this Fluid, *heats* it.

That this is a *real* Fluid, and of all others the moſt *minute*, may be proved from this Experiment. Place a *Thermometer* in an exhauſted *Receiver*, and another in the Air. Heat the Room where they both ſtand; and the Spirits ſhall ariſe in *Vacuo* nearly as ſoon as in *that* ſurrounded with warm Air: And when 'tis thus riſen by the Heat, remove them both to a cold Cellar, and they will both deſcend with equal Quickneſs. Again further,

All Bodies contain this active Fluid; for there is no Sort of Body but will be heated in all its Points: And which is more, all Bodies, whether *fluid* or *ſolid*, are expanded by Heat; and hard Bodies rubbed againſt each other (as I obſerved before) grow warm and ſometimes *hot*.

Fire may, by this Motion *quaquaverſùm* of the Parts, be put into violent Agitation and *looſened* from Bodies, but not *generated* by it. Motion in a Right Line of a whole Body cauſeth no Heat, howſoever rapid, becauſe no Vibration in the Parts among each other (nor conſequently in the united Fluid) is excited. The Experiments relating to *Electricity*, which accompany the Heat which ariſes from *Attrition*, are moſt ſurpriſing, and diſcover ſome of the Properties of this Fluid.

By *Electricity*, I mean a Power which hard Bodies rubbed into Heat have of *drawing* and *repelling* minute and light Bodies. Rub two Pieces of Chryſtal againſt each other, they will yield *Light*, but no ſenſible Heat; (for the Vibrations in a Body muſt be greater than the Heat in our Hand, or they cannot excite any new Senſation;) but Light ſhews the Preſence of Fire as well as Heat: But to enable us to ſee the Light from *Attrition*, we muſt be in an unilluminated Place, as well as in a cold one to perceive the Heat. An empty Glaſs-Tube attrited by Woollen Cloath emits Light; and when this Tube is warmed by the Attrition, 'tis ſurpriſing how it agitates Leaf-Gold, Filings, Motes, and Threads, by repelling and attracting them at a great Diſtance, as they happen to coincide with or oppoſe the Vibration. I will not pretend to explain many Phænomena ariſing from this Attrition; or if I could, perhaps it is not proper to our preſent Subject.

Fire *unites* with Bodies in great Quantities, as well as it is *looſened* from Bodies. Thus in what they call the Philoſophical Calcination of Quick-ſilver, the Mercury placed on heated Sand covered with a Glaſs ſhall in length of Time loſe its Fluidity, and become a grey Powder; the abſolute Weight greatly increaſed, tho' the ſpecific Gravity is leſſened.

In ſome of Sir *Iſaac Newton*'s Experiments on Light, may be ſeen how ſtrongly Light attracts and is attracted by all Bodies, but chiefly by *Sulphur, i. e.* in a Philoſophical Senſe by every thing inflammable. As Attrition excites thoſe Vibrations which cauſe *Fire*, ſo doth Fermentation moſt powerfully; Fermentation to the Eye in many Inſtances cauſing the moſt violent Motion every way amidſt its Parts, and therefore cannot but agitate with Violence. *How* Fermentation cauſeth *Motion*, is hard to ſay; perhaps the Parts violently attract each other, and run fiercely into Contact: But on the Colliſion, the Parts being alſo elaſtic, fly back from the Place from whence they were drawn, into which others by Gravity were fallen, and ſtriking againſt theſe, are again repelled; and thus the Motion encreaſed encreaſes a moſt violent Vibration of the Fluid of Fire, which is the Cauſe that the Parts are often heated *red hot*, and emit luminous Fumes, that is, *Flame*; or elſe emit Fumes not ſo much heated, and therefore only *Smoke*.

Fire thus explained, (whence ſoever it proceeds) may act in Vegetation much after the ſame manner it expands the Air; and makes it, by ſo doing, aſcend and carry up with it *Films* of Water; which when thus got above-ground, and there more heated, it opens and extends the Veſſels of Plants, and fits them to receive larger Supplies.

Fire may ſwell and join with the Fruits of the Earth, as it did in the Experiment with Quick-ſilver, and ſo may make Plants eaſily inflammable. And perhaps the Richneſs of ſome Fruits in Southern Countries, ſo much preferable to our own, may be chiefly owing to the want of a ſufficient Plenty of this Nouriſhment; Plants being in this Senſe true Fire-Eaters, and expect to be fed with Heat, as well as to have due and proper Food drawn from the Soil. But Dr. *Woodward* rightly obſerves, Fire may be in too great a proportion for ſome Plants, and occaſion the hurrying off their Juices too faſt. And therefore when the *Day* hath filled the Veſſels, may we not ſay Plants want *Reſt* by *Night?* that the Cold may condenſe the inward Steams, and let it *drop* the Vegetable Matter to nouriſh them.

For want of this Reſt in long hot Seaſons, it ſhould ſeem that ſome Plants are burnt up; the Juices being hurried thro', without leaving any Refreſhment behind them. And if ſo, the Managers of *Fire-walls* ſhould be admoniſhed to imitate Nature, and make ſome *Intermiſſions* of Heat. All that ſhould be given at Night, ſhould be only to take off the Rage and Fury of Froſts, rather to *ſoften* than to *heat* the Air; but then again in the Day to let them rival the Heat and Sultrineſs of the Climate natural to the Fruit you would introduce. Again,

Fire pulls every thing to pieces, and by that fits all for *Revegetation.* It *hardens* Clay into Bricks, and *ſoftens* Stone into Lime. It will by burning the Roots of Weeds, prepare their Salts (the diſſoluble Parts) to be ſuſpended by Water, and lets the other act like Aſhes. It unites with the Salts of Lime, and makes them *Cauſtic*; and by this means in proper Soils it makes the Lime act like an artificial Sun, and thereby much accelerates the ripening of Grain, which is ſometimes wanted in Northern Climes. *Fire* alſo it ſelf acts as a Manure, by acting ſtrongly on the *Sulphur* in the Earth, the Rays of the Sun heating and agitating all the minute Parts of Vegetable Matter. And accordingly it hath been experimentally found true, that when the Land hath had its due Tillage and Fallows in a hot and dry Summer, it hath extracted as much Riches from the Sun, as it gets by being manured in a wet and cold one.

In ſhort, *Heat* much contributes to the Fluidity of Bodies, by deſtroying the Tenacity of the Parts, and by that Means aſſiſts Vegetation. *Heat* is retained in Bodies, after the Body which cauſed it is removed. But yet ſome Bodies retain Heat longer than others. *Sand* and *Gravel*, for Inſtance, longer than *Loam* or *Chalk*; *Chalk* longer than *Marle*, and *Marle* than *Clay*. From ſuch Obſervations as theſe, with a due Regard had to a Climate guarded from ſharp Winds, and out of the Neighbourhood of ſnowy Mountains; the Variety of Situations and their Effects on Vegetables, I am ſatisfied, may be much better and with greater Certainty deduced, than from a few Degrees of Latitude, or from what is commonly called a little Proximity to the Sun. Which glorious Body of Light and Fire now offers itſelf to be conſidered more particularly.

It is manifeſt, there is no *Heat*, but there is alſo ſome *Fire*; therefore all Heat is a Degree of Fire: Thus the Sun, being a Body of *Fire*, doth with Us all Things, and that more regularly, which a ſmall Fire will do; for its great and neceſſary Uſe in Vegetation is ſufficiently known; Heat and Moiſture being what bring all Things to Maturity.

Dr. *Halley*, in the *Philoſophical Tranſactions*, No. 203. has given us a Table of the proportionable Heat of the Sun in all Latitudes; with the Method of collecting the ſame: But ſince he eſtimated nothing but the bare Quantity of Rays, even without the Allowance for the weaker Impreſſion in greater Obliquities, and without any Conſideration of the great Loſs of thoſe Rays in paſſing through a different Length of Atmoſphere at different Altitudes, it will be proper to give the Curious a new Table. This I had from my good and learned Friend Mr. *Whiſton* long ago, when I deſired him to conſider this Matter, as he then did; and this, at my ſecond Deſire, he has now again improved, and gives me leave to ſet it down, together with his former Letter, which he has alſo improved. That Letter and Table here follow *verbatim*.

Dear Sir,

“I Have conſidered the Problem you deſired the Solution of from me, “ and have peruſed the Learned Dr. *Halley*'s Account of the ſame “ in the *Philoſophical Tranſactions*, Numb. 203. And the Reſult of my “ Enquiry is this: That the Quantity of Heat derived from the Sun, if “ there were no Atmoſphere to intercept any of its Rays, would be *al*-“ *ways* as the Squares of the Sines of the Sun's Altitude above the Ho-“ rizon, *i. e.* that the Quantity or Number of its Rays is ſtill as the “ Sines of that Altitude; and the particular Force of each Ray, or equal “ Quantity of Rays, (which when more oblique are weaker, and more “ perpendicular are ſtronger) is in the ſame Proportion of the Sines alſo: “ Which equal Proportions, when compounded, do conſtitute the Pro-“ portion of the Squares of thoſe Sines; and ſince there is an Atmo-“ ſphere, will be nearly as thoſe Numbers divided by other Numbers, “ expreſſing the Quantity of Air they paſs through at every Angle of “ Elevation; which in the Horizon is about twelve times as much as in “ a vertical Situation: as Dr. *Keill* rightly ſtates this Matter in his Aſtro-“ nomical Lectures, *p.* 316. Upon which Foot I have ſet down Tables “ of the Quantity of Heat derived from the Sun at Noon on the longeſt “ Day, *June* 10. At the Sun's Entrance into *Taurus* and *Virgo*, *April*

“ 10.

“ 10. and *Auguſt* 12. And on the *Equinox*-Days, *March* 10. and *Sep-*
“ *tember* 12. for the ſeveral Latitudes from Forty Four to Fifty Six; or
“ from the Latitude of *Montpelier* in the *South* of *France*, to that of
“ *Edinburgh* in *Scotland*; which will be ſufficient for an Eſtimate of the
“ *Summer* Quantity of this Heat in general for the ſame Latitudes, or ſo
“ far as the ripening of *Summer* Fruits is concerned: And it will in ſome
“ meaſure prove what you aim at, *viz.* That 'tis hardly the ſingle Weak-
“ neſs of the Sun's Heat, that hinders thoſe Fruits from ripening tolera-
“ bly well in the Middle, or even ſomewhat *Northern* Parts of *Eng-*
“ *land*, which are known to come to conſiderable Perfection in the
“ *Southern* Parts of it: Since it is evident by the Tables, that the Diffe-
“ rence of an entire Degree in the *South* of *France* is not quite the Fortieth
“ Part of the whole Solſtitial Heat in *June*; but about the Thirtieth Part
“ of the other in *April* and *Auguſt*; and no more than the Eighteenth
“ Part, even in *March* and *September*; and in the *North* of *England*, the
“ Difference of an entire Degree is no more than the Thirtieth Part of
“ the Heat in *June*; but about the Eighteenth Part of the other in *April*
“ and *Auguſt*, and no more than the Thirteenth Part in *March* and *Sep-*
“ *tember*. The other Occaſions of Variety of Heat in ſeveral Coun-
“ tries are generally obvious, and do not come under our preſent Conſi-
“ deration. I am, *Sir*, a hearty Well-wiſher to your uſeful Deſigns of
“ improving and recommending the Art of *Gardening*; and withal,

Your affectionate Friend and Brother,

Great Ruſſel-ſtreet, *over-*
againſt Montagu *Houſe*,
Feb. 10, 1725-6.

WILL. WHISTON.

N. B. The following Tables and Calculation, though they ſhew the real Difference of the Sun's *Meridian* Heat in different Latitudes; yet do not account for the greater Number of Hours of the Sun being above the Horizon, which a *Northern* Latitude has more than a *Southern* one; which yet is to my preſent Purpoſe to obſerve. I ſhall only therefore inform the Reader in general, and by one round Number, That during all the *Summer* Seaſon (the Time of ripening Fruits) betwixt the Two *Equinoxes*, there are no leſs than One Hundred Hours of Sunſhine at *Durham*, more than there are at *Plimouth*, as might eaſily be ſhewn by a particular Table.

Tables of the Quantity of the Sun's Heat at Noon, when it is Vertical; at the *Summer* Solſtice; the two *Equinoxes*; and the Sun's Entrance into *Taurus* and *Virgo*, for the ſeveral Latitudes from 44° to 56°. *N. B.* The Angles are made by adding the Sun's Declination to the Elevation of the *Equator*.

Degrees of Latitude.	*Places Names.*	*Heat,* June 10.	*Heat,* Ap. 10. *and* Aug. 12.	*Heat,* Mar. 10. *and* Sept. 12.
Vertical Sun.	- - - - - - - - -	100	100	100
44	*Montpelier.*	83	60	37
45	- - - - - - - - -	81	58	35
46	*Lyons.*	79	56	33
47	- - - - - - - - -	77	54	31
48	*Orleance.*	75	52	29
49	*Paris.*	73	50	27
50	*The Lizard.*	71	49	26
51	- - - - - - - - -	69	47	24
51 ½	*London.*	68	46	23 ½
52	- - - - - - - - -	67	45	23
52 ½	*Yelvertoft.*	66	44	22 ½
53	- - - - - - - - -	65	43	22
53 ⅓	*Lincoln.*	64	42	21
54	- - - - - - - - -	63	41	20
55	*Newcaſtle.*	62	38	19
56	*Edinburgh.*	60	37	18

This is what the wiſe Author of Nature hath contrived for us; to ſet that glorious Body of *Fire* at ſuch an immenſe Diſtance from us, that it ſhall only *warm* and *comfort*, not *ſcorch* and *burn* us; as it certainly would do, were our Planet placed but as near to the Sun as *Venus* and *Mercury* are, whoſe Inhabitants, (for doubtleſs ſuch there are) by the ſame unerring Contriver and wiſe Governor of the Univerſe, are ſo formed as to need and require a ſtronger and nearer Influence of the *Sun*. Now, that what we call *Heat* in the Sun is really *Fire*, is proved by ſuch an eaſy and natural Demonſtration, as doth in a ſort bring the Sun nearer to us, *viz.*

By the help of a Burning-Glaſs, either *Convex* in Dioptricks, or *Concave* in Catoptricks, we collect the Rays of the Sun into a narrow Compaſs; and according to the Goodneſs, Dimenſion, and exact Poliſh thereof, its burning Influence is more or leſs immediately ſtrong, which is felt in a ſmall bright Point called the *Focus*; and that is nearer or further off the Glaſs, according to the different Dimenſion and Figure of the Glaſs.

From a late Contrivance of the great Sir *Iſaac Newton*, for multiplying the Glaſſes, and making their ſeveral Focus's meet in one, we are made to hope for great Improvements. But it may not be amiſs to relate here, by way of Illuſtration, what we find in the *Philoſophical Tranſactions*, No. 360. of the ſeveral Experiments made concerning the great Power of Mr. *Villette*'s Burning Concave; which is 47 Inches wide, and ground to a Sphere of 76 Inches Radius, its Focus being about 38 Inches diſtant from the Vertex of the Glaſs. Upon Tryal it was found, that a *Diamond* weighing four Grains loſt ſeven eighths of its Weight. An *Emerald* was melted into a Subſtance like a *Turquois* Stone. King *William*'s *Copper Half-penny* melted in 20 Seconds; a *Silver Six-pence* in ſeven and half; *Tin* melted in three; *Caſt Iron* in ſixteen; *Slate* in three; *Tile* in four, and vitrified thro' in eighty; *Calculus Humanus* in two; *Talk* began to calcine in forty; a *Foſſile-Shell* in ſeven, and *Chalk* even fled away in twenty three Seconds.

Theſe Inſtances are ſufficient to ſhew, that the Sun is a prodigious immenſe Body of *Fire*, computed to contain 227500 times the Quantity of Matter which our Earth contains; and tho' it is diſtant from us no leſs than 81,000,000 Miles, gives *Light* and *Heat* and *Fire* in ſuch due and regular Proportions, as abundantly anſwer the Purpoſes of human Life, and ſerve to aggrandize the Wiſdom and Skill of the All-wiſe God who created all Things, and to anſwer the Ends of his Providence; not only in this little World of ours, but in thoſe many other and greater in the remote Diſtances of the Heavens. Thus *the Heavens declare the Glory of God, and the Firmament ſheweth his Handy-Work.*

The genuine and comfortable Effect of this glorious Body of *Fire*, is *Heat* or *Warmth*; which in a due Proportion is as neceſſary to Vegetation, as *Air* or *Earth* or *Water*; and indeed the total Abſence of any one of them is *Death*. By reaſon of the Weakneſs of the Sun's Rays in Winter, artificial Heats are contrived to ſuſtain ſuch tender Plants as will not bear the Severities of our Cold; and thus we tranſlate the Climate of *Italy* into *England*, and naturalize almoſt every ſort of tender Exotic, by the Help of *Fire* and *Heat* contrived by Art, to ſupply the Abſence of the *Sun*.

Altho' it be difficult to ſay exactly how *Heat* operates in Vegetation; yet thus much I think is plain, that it ſets in Motion the Salts of the Earth, and thereby prepares the Roots and Fibres of Plants to fetch in and imbibe their proper terreſtrial Food. The early and cold Dews, which would otherwiſe chill and ſtarve, are hereby diſpoſed to cheriſh and enliven, the Branches and Leaves of Trees. And indeed, the whole Buſineſs of the Circulation of Sap and Juices is begun and continued by *Heat*, the Abſence whereof muſt be *Stagnation*; and Stagnation of Juices in Vegetables, is the ſame as the Stagnation of Blood in Animals, and that is *Death*.

N. B. In ſpeaking of *Fire* and *Heat*, I would not be thought to exclude a *Subterranean Fire*, which may with a great deal of Eaſe be proved to be a reality, and uſeful in the Growth of Plants. This drives their Sap and Juices to the Stem; and when they are there, the Heat of the Sun performs the reſt.

CHAP. IV.

Of WATER.

WATER is a mix'd fluid Body. That which is found in Springs, Rivers, or falls from the Clouds in Rain, is mix'd with *Nitre*; and ſeldom or never free from earthy Particles more or leſs, as appears by daily Obſervation and Experiments: But the chief Body thereof, which conſtitutes the Sea and great Ocean, is always mixt with a great degree of Salt.

The Conſtituent Parts of this Fluid ſeem to be *globular* and *hollow*. If *Water* were not made up of Bubbles or round globular Parts, it could not eaſily be conceived to be a Fluid; for Things that have many Corners will not run upon a gentle Declivity *downwards*, nothing but ſome outward Force would carry them on; but Things that are perfectly round will not lie on a perfect ſmooth Place, unleſs exactly horizontal, without having one Part higher than another; for otherwiſe one Side of the round Thing will be heavier than the other, which puts all in Motion, and ſo ſucceſſively till it meets with Reſiſtance.

If the watry Particles were not porous and hollow, Water might be as heavy as Gold; whereas Gold and Glaſs differ in their Specifick Gravity as *Seven* to *One*. And it is demonſtrable from undoubted Experiments, that Weight is in all Bodies proportionable to the Quantity of Matter in each, there being an equal Propenſity, if I may ſo ſtile it, of all Bodies whatſoever towards the Earth's Center; always ſenſible when the Impediment of the Medium is removed: and accordingly all Bodies deſcend *in vacuo*, be they never ſo porous or compact in Texture, with equal Velocity. It follows therefore, that there is ſeven times as much Matter in Gold as in a Piece of Glaſs of the ſame Magnitude, and conſequently that at leaſt ſix Parts in ſeven in the Bulk of Glaſs muſt be Vacuity or Hollowneſs.

Another Quality of *Water* is, That it will not of itſelf ſeparate from *Air*, be compreſſed or crowded cloſer in its natural State, as *Air* will. Indeed, when it is boiled it will take up near a thirtieth part of Space more than when ready to freeze: Not that it will then be compreſs'd by outward Force more than before; but when it grows cold, it will fall of itſelf, as Bubbles in boiling Water will when the Water cools

Another Quality of *Water* is, its *Freezing*; for it will turn into Ice, which takes up more room: For altho' *hot* Water takes up more Space than *cold*, as hath been ſaid; yet Experience ſhews that Ice will ſo ſwell, that a Bottle of Water not full, will be more than full when frozen, and accordingly the dilated Force will break the Bottle. What ſhould be the true and real Cauſe of this Dilatation and Swelling upon extreme Cold, is not ſo eaſy to determine; only I ſuppoſe it a vulgar Error, that Ice ever *ſinks* in Water: For by certain Experiments it is about an eighth Part lighter than Water, and conſequently muſt *ſwim.* This Fact is made plain by diſſolving a Piece of Ice in hot Water over the Fire, where it will be found to ſwim to the laſt Bit, tho' *hot* Water be much lighter than *cold.*

Some ingenious Men have thought that Nitre flying in the Air adheres to the ſmall Bubbles of Water, and ſo fixes them into Hail, Snow or Ice; that the Nitre in the Form of Wedges ſticks between the Bubbles of Water, and ſo faſtens them together. This indeed (if true) would make Water take up more Space, and anſwer the Difficulty above: But then it would follow, that *Ice*, *Snow* and *Hail*, are plentifully impregnated with Nitre, and of conſequence the *Northern* Countries ſhould abound therewith; which yet is not confirmed by any Experience, and it is plain we have moſt of our Salt-Petre out of the *South:* Neither doth it appear by any Experiments in diſſolving *Snow*, and boiling it away, that any Nitre remains.

If it ſhould be asked, what Good *Snow* doth to the Earth? it may be anſwered, That it keeps it from external Cold, as well as the Plants which grow in it. And altho' as yet it cannot be diſcovered that it *conveys* any Nitre with it in falling; yet by its Poroſity it may *imbibe* ſome, while it lieth on the Earth. The great Uſe of Rain and Dews to moiſten and refreſh the Earth, and to add to the Maturity of Vegetables, is too obvious to require any particular mention here; becauſe indeed Nitre it ſelf, ſo eſſentially neceſſary to Vegetation, cannot exert its Qualities, nor be put in Motion without it.

Another Quality, more than what I have already ſpoken of, is the *Volatility* of Water: But this may without difficulty be apprehended, by conſidering that globular Parts touch one another but in Points; and Water having but little glutinous Matter in it, the Globes or Bubbles may be very thin and light, and ſo eaſily fly away by the leaſt Force of Fire or Heat. For the like Reaſon *Spirits* fly ſooner than Water, having thoſe Qualities of Thinneſs and Lightneſs in much higher Perfection.

If it ſhould be thought that the aforegoing Definition of *Water* is too ſhort, and therefore defective; I would add here, that when pure, it is a Fluid, not only volatile, but void of all Savour and Taſte. The Reaſon may be, becauſe its flexible Parts ſlip gently over the Tongue, and are not ſharp enough to prick the Nerves and affect the Taſte. But this is to be underſtood of *pure Water*, void of all kind of Salt, ſuch as diſtilled Water is, and next, that of Rain: For the moſt wholeſome Fountain-Water often derives ſomething of Saltneſs from the Earth. Moreover, if pure, it is alſo without *Smell*; for the purer any Water is, the leſs Smell it hath: For the Reaſon why the Particles do not prick the Tongue, may likewiſe be the Reaſon why they do not affect the Smell. The Flexibility and Smoothneſs of Water is alſo ſuch, that they cannot pierce the Olfactory Nerves. Fountain-Water has indeed ſome Smell; but then it is a ſign that ſuch Water is not pure.

The other Part of the Definition of *Water*, is, that it probably conſiſts of *ſmall*, *hard*, *porous*, *ſpherical* Particles, of equal Diameters, and equal ſpecific Gravities: That there are alſo between them Spaces ſo large, and ranged in ſuch a manner, as to be pervious on all Sides. Their Smoothneſs accounts for their ſliding eaſily over the Surface of one another; and their Sphericity keeps them from touching one another in more Points than one; and by *both* theſe, their Friction in ſliding over each other is made very ſmall and eaſy.

But becauſe the Operation and Uſe of Water in the buſineſs of Vegetation, is of ſome Conſequence to be well underſtood; I purpoſe to ſet it in a Light already given us by the learned and ingenious Dr. *Woodward*, whoſe Experiments have been exact and regular, and his Obſervations drawn from them allowed to be juſt and rational. Both his Obſervations and Experiments are to be found in the *Philoſophical Tranſactions*, No. 259. And altho' ſeveral late Writers have tranſcribed them for a more diffuſive Knowledge; yet I think no Syſtem of Vegetables ſhould want them: And until others of Leiſure and Ingenuity ſhall think fit to oblige the World with more and further Experiments and Obſervations thereon, we may well be content with theſe, as founded on Reaſon, as well as Experience.

The Experiments and Facts of Plants ſet in Waters of different Natures and in different Seaſons, I ſhall not repeat; becauſe the Obſervations and Reaſonings deduced from them will occaſionally explain them: And thoſe who are more curious may eaſily have recourſe to the Treatiſe it ſelf, which hath hitherto given univerſal Satisfaction.

Obſervation I. *In Plants of the ſame kind, the leſs they are in Bulk, the ſmaller Quantity of the fluid Maſs in which they are ſet, is drawn off; the Diſpendium of it where the Maſs is of equal Thickneſs, being pretty nearly proportioned to the Bulk of the Plant.*

Thus the Plant in the Glaſs marked A that weighed 27 Grains, drew off but 2558 Grains of the Fluid; and that Plant in B that weighed 28 Ounces and a quarter, took up but 3004 Grains of the Fluid: Whereas that Plant in H that weighed 127 Grains, took up 14190 Grains of the liquid Maſs. The Water ſeems to aſcend up the Veſſels of Plants much after the ſame manner as up a Filter: and it is no ſtrange thing that a larger Filter ſhould draw off more Water than a leſſer one; or that a Plant that hath more and larger Veſſels, ſhould take up a greater ſhare of the Fluid in which it is ſet, than one that hath fewer and ſmaller ones can. This is not noted as a thing very conſiderable in it ſelf; but chiefly in regard to what is to be offered anon, and that it may be ſeen that in other Collations of Things a due Allowance has been made for this Difference.

Obſervation II. *The much greater Part of the fluid Maſs that is firſt drawn off and conveyed into the Plants doth not ſettle nor abide there, but paſſes thro' the Pores of them and is exhaled up into the Atmoſphere.*

It is certain, that the Water in theſe Experiments aſcended only thro' the Veſſels of the Plants: The Glaſſes F and G, which had no Plants in them, (tho' they were diſpoſed in the like manner as the reſt were) remained at the end of the Experiment as at firſt, and none of the Water was gone off: And it is as certain, that the greateſt Part of it flies off from the Plant into the Atmoſphere. The leaſt Proportion of the Water expended, was to the Augmentation of the Plant as 46 or 50 to 1; and in ſome the Water drawn off was 100, 200, nay in one above 700 times as much as the Plant had received Addition. This ſo continual an Emiſſion and Detachment of Water in ſo great plenty from the Parts of Plants, affords a manifeſt Reaſon, why thoſe Countries which abound with Trees, and the larger Vegetables eſpecially, ſhould be very obnoxious to Damps, great Humidity in the Air, and more frequent Rains, than others which are more open and free.

The great Moiſture in the Air was a great Annoyance to thoſe who firſt ſettled in *America*, which then was much overgrown with Woods and Groves: But as they were burnt and deſtroyed, to make room for Habitations and the Culture of the Earth, the Air mended and cleared up apace, and became of a Temper much more dry and ſerene than before.

Nor doth this Humidity go off pure and alone; but uſually carries out along with it many Parts of the ſame Nature, whereof the Plants thro' which it paſſes do conſiſt. It is true, the *Craſſer* are not ſo eaſily born up into the Atmoſphere, but are uſually depoſited on the Surface of the Flowers, Leaves, and other Parts of the Plants. Hence are produced our Mannaes, our Honeys, and other gummous Exſudations of Vegetables. But the finer and lighter the Parts are, with ſo much the greater eaſe they are ſent up into the Atmoſphere, and thence are conveyed to our Organs of Smelling by the Air we draw in by Reſpiration; and are either pleaſant or offenſive, beneficent or injurious to us, according to the Nature of the Plants from whence they ariſe.

And ſince theſe owe their Riſe to the Water which aſcends out of the Earth thro' the Bodies of Plants, we cannot be far to ſeek for the Cauſe why they are more numerous in the Air, and we find a greater Quantity of Odours exhaling from Vegetables in warm humid Seaſons, than in any other whatever.

Obſervation III. *A great Part of the Terreſtrial Matter that is mixt with the Water aſcends up into the Plant as well as the Water.*

There was much more Terreſtrial Matter, at the end of the Experiment, in the Water of the Glaſſes F and G that had no Plants in them, than in thoſe that had Plants. The Garden-Mould in the Glaſſes K and L was conſiderably diminiſhed and carried off. Nay, the Terreſtrial and Vegetable Matter was born up in the Tubes filled with Sand, Cotton, *&c.* and in that Quantity as to be evident even to Senſe. And the Bodies in the Cavities of the other Tubes, which had their lower Ends immerſed in Water, wherein *Saffron*, *Cochineal*, *&c.* had been infuſed, were tinged with *yellow*, *purple*, *&c.*

If it may be permitted to look abroad awhile toward the Shores and Parts within the Verge of the Sea, there will be found a large Scene of Plants, that along with the *Vegetable* take up the mere *Mineral* Matter alſo; ſuch as *Sea Purſlains*, the ſeveral Sorts of *Algas*, *Samphires* and other Marine Plants. Theſe contain common *Sea Salt*, which is all one with the *Foſſile*, in ſuch Plenty, as not only to be plainly diſtinguiſhed on the Palate, but may be drawn forth from them in conſiderable Quantities; and ſome affirm that there are Plants found that will yield *Nitre* and other Mineral Salts.

As to *Vegetable* Matter, it is manifeſt how apt and how much diſpoſed it is (being ſo very fine and light) to attend Water in all it's Motions, and to follow it into each of its Receſſes; not only from the Inſtances that have been alleged above, but from many others. If you percolate it with all the Care imaginable, if you filter it with never ſo many Filtrations, yet there will remain ſome Terreſtrial Matter: It is true, the Fluid will be thinner every time than other, and more diſengaged from the ſame Matter, but never *wholly* free and clear. I have filtered Water thro' ſeveral wholly free and clear Sheets of thick Paper, and after that thro' very cloſe and fine Cloath twelve times doubled, nay have done this over and over again, and yet after all there was a conſiderable Quantity of this Matter diſcoverable in the Water.

Now if it paſſes thus thro' Interſtices that are ſo very ſmall and fine along with the Water, it is leſs ſtrange it ſhould attend it in its Paſſage thro' the Ducts and Veſſels of Plants. It is true, that filtering and diſtilling of Water does intercept and make it quit ſome of the earthy Matter it was before impregnated with; but then that which after this continues with the Water is fine and light, and conſequently ſuch as in a peculiar manner is fit for the Growth and Nouriſhment of Vegetables. And this is the Caſe of *Rain-Water.*

The Quantity of Terreſtrial Matter that it bears up into the Atmoſphere is not great; but that which it doth bear up is mainly of that *light* kind of Vegetable Matter, and that too perfectly diſſolved and reduced to ſingle Corpuſcles, all fit to enter the Tubules and Veſſels of Plants: And upon this Account it is that *Rain-Water* is ſo fertile and prolific.

The Reaſon why in this Propoſition I ſay, that only a *great Part* of the Terreſtrial Matter that is mixt with the Water aſcends up with it into the Plant is, becauſe *all of it* cannot. The Mineral Matter is a great deal of it, not only groſs and ponderous, but *ſcabrous* and *inflexible*, and ſo not diſpoſed to enter the Pores of the Roots. And a great many of the ſimple Vegetable Particles do by degrees unite and form, ſome of them, ſmall Clods and *Moleculæ*, ſuch as before mentioned in H, K, and L, ſticking to the Extremities of the Roots of thoſe Plants: Others of them intangle in a more looſe manner, and form the *Nubeculæ* and great Bodies that are commonly obſerved in ſtagnant Water. When theſe are thus conjoined, they are too big to enter the Pores which they might have done ſingly.

Thoſe Perſons who are converſant in Agriculture, will eaſily ſubmit to this. They are well aware, that tho' their Earth be never ſo rich and good, and ſo fit for the Production of Corn and other Vegetables, yet unleſs the Parts of it be ſeparate and looſe, little will come of it. It is therefore upon this account that they beſtow the Pains they do in the Culture of it, plowing, harrowing, and breaking the clodded Lumps of Earth. It is the ſame way that *Sea Salt*, *Nitre* and other *Salts* promote Vegetation. I am ſorry I cannot ſubſcribe to the Opinion of thoſe learned Gentlemen, who imagine that Nitre is eſſential to Plants, and that nothing is acted in the Vegetable Kingdom without it: For by all the Trials I have been able to make, the Thing is quite otherwiſe. But *this*, Nitre and other Salts certainly do; they looſen the Earth and ſeparate the concreted Parts of it, and by that means fit and diſpoſe them to be aſſumed by the Water, and carried up into the Seed or Plant for its Formation and Augment.

There is no body but muſt obſerve how apt all Sorts of *Salts* are to be wrought upon by Moiſture; how eaſily they liquate and *run* with it;

and when theſe drawn are off, and have deſerted the Lumps wherewith they were incorporated, thoſe muſt moulder immediately, and fall aſunder of courſe. The hardeſt Stone, if it happen, as it frequently doth, to have any Salt intermixed with the Sand of which it conſiſts; upon being exposed to an humid Air, in a ſhort time diſſolves and crumbles all to Pieces: And much more will clodded Earth and Clay, which are not near of ſo compact and ſolid a Conſtitution as Stone is.

The ſame way likewiſe it is, that *Lime* is ſerviceable in this Affair. The Husbandman ſaith of it, that it does not *fatten*, but only *mellow* the Ground: By which they mean, that it doth not contain any thing in it ſelf that is of the ſame Nature with the Vegetable Mould, or afford any Matter fit for the Formation of Plants; but meerly ſoftens and relaxes the Earth, and by that means renders it more capable of entring the Seeds and Vegetables ſet in it, in order to their Nouriſhment, than otherwiſe it would have been. The Properties of *Lime* are well known, and how apt it is to be put into a Ferment and Commotion by Water; nor can ſuch Commotion ever happen when *Lime* is mixt with Earth, however hard and clodded that may be, without opening and looſening of it.

Obſervation IV. *The Plant is more or leſs nouriſhed and augmented, in proportion as the Water in which it ſtands contains a greater or ſmaller Quantity of proper Terreſtrial Matter in it.*

The Truth of this Propoſition is ſo eminently diſcernable thro' the whole Proceſs of theſe Trials, that I think no doubt can be made of it. The Mint in the Glaſs C was much of the ſame Bulk and Weight with thoſe in A and B; but the Water in which that was, being *River-Water*, which was apparently more ſtored with Terreſtrial Matter than the *Spring* or *Rain-Water*, wherein they ſtood, were; it had thriven to almoſt double the Bulk that either of them had, and with a leſs Expence of Water too. So, in like manner, the Mint in L, in whoſe Water a Quantity of good Garden-Mould had been diſſolved, tho' it had the Diſadvantage to be leſs when it was firſt ſet than either of the Mints H or I, the Water of which was the very ſame with that in L, but had not any of the Earth mixt with it; yet in a ſhort time the Plant not only overtook, but much outſtript thoſe, and at the End of the Experiment was very conſiderably bigger and heavier than either of them.

Alſo the Mint in N, tho' it was leſs at firſt than that in M, being ſet in that *turbid thick feculent* Water that remained behind, after that wherein M was ſet was diſtilled off, had in the End more than double its original Weight and Bulk, and received above twice the additional Encreaſe which that in M had done, which ſtood in the thinner diſtilled Water; and, which is as conſiderable, had not drawn off half the Quantity of Water which that had. The Reaſon why, in the beginning of this Article, I limit the proportion of the Augment of the Plant to the Quantity of the proper Terreſtrial Matter in the Water, is, becauſe All, even the *Vegetable* Matter, to ſay nothing of the *Mineral*, is not proper for the Nouriſhment of every Plant.

There may be, and doubtleſs there are, *ſome* Parts that are much alike in different Species of Plants, and ſo owe their Supply to the ſame common Matter; but it is plain *all* cannot. And there are other Parts ſo differing, that it is no ways credible that they ſhould be formed all out of the ſame Sort of Corpuſcles. So far from it, that there want not good Indications (as we ſhall ſee by and by) that every Kind of Vegetable requires a peculiar and ſpecific Matter for its Formation and Nouriſhment; yea, each Part of the ſame Vegetable doth ſo, and there are very many and different Ingredients that go to the Compoſition of the ſame individual Plant.

If therefore the Soil, wherein any Vegetable or Seed is planted, contains all or moſt of theſe Ingredients, and thoſe in due Quantity, it will grow and thrive there, otherwiſe it will not. If there be not as many Sorts of Corpuſcles as are requiſite for the Conſtitution of the main and eſſential Parts of the Plant, it will not proſper at all. If there *be* theſe, and not ſufficient Plenty, it will ſtarve, and never arrive at its natural Stature: or if there be any the leſs neceſſary and eſſential Corpuſcles wanting, there will be ſome Failure in the Plant. It will be defective in *Taſte*, in *Smell*, in *Colour*, or ſome other way. But tho' a Tract of Land may happen not to contain Matter proper for the Conſtitution of ſome one particular Kind of Plant, yet it may for ſeveral others, and thoſe much differing among themſelves. The Vegetative Particles are commixt and blended in the Earth, with all the Diverſity and Variety as well as all the Uncertainty conceivable. I have given ſome Intimations of this elſewhere,* and ſhall not repeat them here; but hope in due time to put them into a much better Light than *that* they there ſtand in.

It is not poſſible to imagine how one uniform homogeneous Matter, having its Principles or organical Parts all of the ſame *Subſtance*, *Conſtitution*, *Magnitude*, *Figure* and *Gravity*, ſhould ever conſtitute Bodies ſo egregiouſly unlike in all thoſe Reſpects, as Vegetables of different Kinds are, nay even as the different Parts of the ſame Vegetable; that one ſhould carry a *reſinous*, another a *milky*, a third a *yellow*, a fourth a *red* Juice in its Veins: One afford a *fragrant*, another an *offenſive* Smell; one be *ſweet* to the Taſte, another *bitter*, *acid*, *acerb*, *auſtere*, &c. that one ſhould be *nouriſhing*, another *poiſonous*; one *purging*, another *aſtringent*. In brief, that there ſhould be that vaſt Difference in them in their ſeveral Conſtitutions, Makes, Properties and Effects, and yet all ariſe from the very ſame Sort of Matter, would be very ſtrange. And ſo note that, by the by, this Argument makes equally ſtrong againſt thoſe, who ſuppoſe meer *Water* the Matter out of which all Bodies are formed.

The *Cataputia* in the Glaſs F received but very little Encreaſe, only three Grains and a half, all the while it ſtood, tho' 2501 Grains of Water were ſpent upon it. I will not ſay the Reaſon was, becauſe that Water did not contain in it Matter fit and proper for the Nouriſhment of that peculiar and remarkable Plant. No, it may be the Water was not a proper Medium for it to grow in, and we know there are very many Plants that will not thrive in it. Too much of that Liquor in ſome Plants may probably hurry the Terreſtrial Matter thro' their Veſſels too faſt, for them to arreſt and lay hold of it. Be that as it will, 'tis moſt certain there are peculiar Soils that ſuit particular Plants. In *England*, *Cherries* are obſerved to ſucceed beſt in *Kent*; *Apples* in *Herefordſhire*; *Saffron* in *Cambridgeſhire*; *Woad* in two or three of our Midland Counties; and *Tea-*

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* *Nat. Hiſt. of the Earth*, p. 228.

zles in *Somerſetſhire.* This is an Obſervation that hath held in all Parts, and indeed in all Ages of the World. The moſt antient Writers of Huſbandry took Notice of it, and are not wanting in their Rules for making choice of Soils ſuited to the Nature of each Kind of Vegetable they thought valuable or worth propagating.

But, which is a further Proof of what I am here endeavouring to advance, that Soil that is once proper and fit for the Production of ſome one Sort of Vegetable, does not *ever* continue to be ſo. No, in Tract of Time it loſes that Property; but ſooner in ſome Lands, and later in others. This is what All who are converſant in theſe Things know very well. If *Wheat*, for Example, be ſown upon a Tract of Land that is proper for that Grain, the firſt Crop will ſucceed very well, and perhaps the ſecond and the third, as long as the Ground is *in Heart*, as the Farmers ſpeak; but in a few Years it will produce no more, if ſow'd with that Corn. Some other Grain indeed it may, as *Barley:* And after *this* hath been ſowed ſo often, that the Land can bring forth no more of the ſame, it may afterward yield good *Oats*; and perhaps *Peaſe* after them. At length it will become barren; the Vegetative Matter that at firſt it abounded withal being educed forth of it by thoſe ſucceſſive Crops, and moſt of it borne off.

Each Sort of Grain takes forth that peculiar Matter that is proper for its own Nouriſhment. Firſt the *Wheat* draws off thoſe Particles that ſuit the Body of that Plant, the reſt lying all quiet and undiſturbed the while. And when the Earth has yielded up all *them*, thoſe that are proper for *Barley*, a different Grain, remain ſtill behind, till the ſucceſſive Crops of that Corn fetch *them* forth too: And ſo the *Oats* and *Peaſe* in their turn; till in fine *all* is carried off, and the Earth in great meaſure drained of that Sort of Matter.

After all which, that very Tract of Land may be brought to produce another Series of the ſame Vegetables; but never till it is ſupplied with a new Fund of Matter of like Sort with that it at firſt contained. This Supply is made ſeveral Ways: By the Ground's lying Fallow for ſome Time, till the Rain has poured down a freſh Stock upon it; or by the Tiller's Care in manuring it. And for further Evidence that this Supply is really of like Sort, we need only reflect a while upon thoſe Manures, that are found by conſtant Experience beſt to promote Vegetation, and the Fruitfulneſs of the Earth. Theſe are chiefly either Parts of *Vegetables*, or of *Animals* which indeed either derive their own Nouriſhment immediately from Vegetable Bodies, or from other Animals that do ſo. In particular, the *Blood*, *Urine*, and *Excrements* of Animals, *Shavings* of Horns and Hoofs; *Hair*, *Wooll*, *Feathers*, calcined *Shells*, *Lees* of Wine and of Beer; *Aſhes* of all Sorts of Vegetable Bodies, *Leaves*, *Straw*, *Roots* and *Stubble;* turned into the Earth, by Plowing, or otherwiſe to rot, and diſſolve there: Theſe, I ſay, are our beſt Manures; and, being Vegetable Subſtances, when refunded back again into the Earth, ſerve for the Formation of other like Bodies.

Not wholly to confine our Thoughts to the Fields; let us look a while into our Gardens, where we ſhall meet with ſtill further Confirmations of the ſame Thing. The *Trees*, *Shrubs*, and *Herbs*, cultivated in Theſe, after they have continued in one Station, till they have derived thence the greater Part of the Matter fit for their Augment, will decay and degenerate, unleſs either freſh Earth or ſome fit Manure be apply'd unto them. 'Tis true, they may maintain themſelves there for ſome Time, by ſending forth Roots further and further to a great Extent all round to fetch in more remote Proviſion; but at laſt, all will fail, and they muſt either have a freſh Supply brought to them, or they themſelves be removed and tranſplanted to ſome Place better furniſhed with Matter for their Subſiſtence. And accordingly, Gardeners obſerve that Plants that have ſtood a great while in a Place, have longer Roots than uſual; Part of which they cut off when they tranſplant them to a freſh Soil, as now not of any further Uſe to them.

All theſe Inſtances, to paſs over a great many others that might be alleged, point forth a particular Terreſtrial *Matter*, and not *Water*, for the Subject to which Plants owe their Encreaſe. Were it Water only, there would be no Need of Manures, or of tranſplanting them from Place to Place. The Rain falls in all Places alike: In this Field and in that indifferently: In one Side of an Orchard or Garden, as well as another: Nor could there be any Reaſon why a Tract of Land ſhould yield Wheat one Year, and not the next, ſince the Rain ſhowers down alike in each.

Obſervation V. *Vegetables are not formed of Water, but of a certain Terreſtrial Matter.*

It hath been ſhewn, that there is a conſiderable Quantity of this Matter contained both in Rain, Spring and River Water; that the much greater Part of the fluid Maſs that aſcends up into Plants, does not ſettle or abide there, but paſſes thro' the Pores of them, and exhales up into the Atmoſphere: That a great Part of the Terreſtrial Matter mixt with the Water paſſes up into the Plant along with it; and that the Plant is more or leſs augmented, in Proportion as the Water contains a greater or ſmaller Quantity of that Matter. From all which we may very reaſonably infer, that *Earth*, and not *Water*, is the Matter that conſtitutes Vegetables. The Plant in E drew up into it 2501 Grains of the fluid Maſs, and yet had received but three Grains and a half Encreaſe from all that. The Mint in L, tho' it had at firſt the Diſadvantage to be much leſs than that in I, yet being ſet in *Water* wherein *Earth* was plentifully mixt, and that in I only in Water without any ſuch additional Earth, it had vaſtly out-grown the other, weighing at laſt 145 Grains more than *that* did, and ſo having gained about twice as much as *that* had. In like manner, that in K, tho' it was a great deal leſs when put in, than that in I, and alſo was impaired and offended by Inſects; yet being planted in Water wherein Earth was diſſolved, (whereas the Water wherein I ſtood had none,) it not only overtook, but conſiderably ſurpaſſed the other, weighing at leaſt 29 Grains more than that in I; and yet had not expended ſo much Water as that by above 2400 Grains. The Plant in N, tho' at firſt a great deal leſs than that in M; yet being ſet in the foul craſs Water, that was left in the *Still*, after that in which M was ſet was drawn off, in Concluſion had gained in Weight above double what that in the finer and thinner Water had. The Proportion of the Augment of that Plant that throve moſt, was to the fluid Maſs ſpent upon it as 1 to 46. In others it was but as 1 to 60, 100 and 200. Nay, in the *Cataputia* it was but as 1 to 714. The Mint in B took up 39 Grains of Water a Day, one Day with another, which was much more than the whole Weight of the Plant originally: And yet with all this it gained not one fourth of a Grain a Day in Weight. Nay, that in H took up 253 Grains a Day of the Fluid, which was near twice as much as its original Weight, it weighing when firſt ſet in the Water but 127 Grains; and after all, the daily Encreaſe of the Plant was no more than $2\frac{15}{56}$ Grains.

Obſervation VI. *Spring and Rain-Water contain pretty near an equal Charge of Vegetable Matter*; *River-Water more than either of them.*

The Plants in the Glaſſes A B and C were at firſt of much the ſame Size and Weight. At the End of the Experiment, the Mint in A had gained 15 Grains out of 2558 Grains of *Spring-Water*; that in B 17 Grains and a half out of 3004 Grains of *Rain-Water*; but that in C had got 26 Grains out of only 2493 Grains of *River-Water.* I do not found this Propoſition ſolely upon theſe Trials, having made ſome more, which I do not here relate, that agree well enough with theſe. So that the Proportion here delivered will hold for the main; but a ſtrict and juſt Compariſon is hardly to be expected. So far from it, that I make no doubt but the Water that falls in Rain at ſome times, contains a greater Share of Terreſtrial Matter, than that which falls at others. A more powerful and intenſe Heat muſt needs hurry up a larger Quantity of that Matter along with the humid Vapours, that form Rain, than one more feeble and remiſs ever poſſibly can. The Water of one Spring may flow forth with an higher Charge of this Matter, than that of another: This depending partly upon the Quickneſs of the Ebullition of the Water, and partly upon the Quantity of that Matter latent in the *Strata* thro' which the Fluid paſſes, and the greater or leſs Laxity of thoſe *Strata.* For the ſame Reaſon the Water of one River may abound with it more than that of another. Nay, the ſame River, when much agitated and in Commotion, muſt bear up more of it, than when it moves with leſs Rapidity and Violence.

That there is a great Quantity of this Matter in Rivers, and that it contributes vaſtly to the ordinary Fertility of the Earth, we have an illuſtrious Inſtance in the *Nile*, the *Ganges*, and other Rivers, that yearly overflow the neighbouring Plains. Their Banks ſhew the faireſt and largeſt Crops of any in the whole World: They are even loaded with the Multitude of their Productions: And thoſe who have not ſeen them, will hardly be induced to believe the mighty Returns thoſe Tracts make in compariſon of Others that have not the Benefit of like Inundations.

Obſervation VII. *Water ſerves only for a Vehicle to the Terreſtrial Matter which forms Vegetables, and doth not it ſelf make any Addition unto them.*

Where the proper Terreſtrial Matter is wanting, the Plant is not augmented, tho' never ſo much Water aſcend into it. The *Cataputia* in E took up more Water than the Mint in C, and yet had grown but very little, having received only 3 Grains and a half of additional Weight; whereas the Other had received no leſs than 26 Grains. The Mint in I was planted in the ſame ſort of Water as that in K was, only the latter had *Earth* diſſolved in the Water; and yet that drew off 13140 Grains of the Water, gaining it ſelf no more than 139 Grains in Weight; whereas the other took up but 10731 Grains in Weight: Conſequently *that* ſpent 2409 Grains more of the Water than *this* in K did, and yet was not ſo much increaſed in Weight as this by 29 Grains.

The Mint in M ſtood in the very ſame Kind of Water as that in N did; but the Water in M having much leſs Terreſtrial Matter in it than that in N had, the Plant bore up 8803 Grains of it, gaining it ſelf only 41 Grains the while. Whereas that in N drew off no more than 4344, and yet was augmented 94 Grains. So that it ſpent 4459 Grains of Water more than that did; and yet was not it ſelf ſo much increaſed in Weight as that was by 53 Grains. This is both a very fair and a very concluſive Inſtance; on which account it is that I make oftener uſe of it Indeed they are all ſo: And to add any thing further on this Head, will not be needful.

'Tis evident therefore, *Water* is not the Matter that compoſes Vegetable Bodies; it is only the Agent that conveys that Matter to them, that introduces and diſtributes it to their ſeveral Parts for their Nouriſhment: That *Matter* is ſluggiſh and unactive, and would lie eternally confined to its Beds of Earth, without ever advancing up into Plants, did not Water, or ſome like Inſtrument, fetch it forth and carry it unto them. That therefore there is that plentiful Proviſion and vaſt Abundance of it ſupplied to all Parts of the Earth, is a Mark of a natural Providence ſuperintending over the Globe we inhabit, and ordaining a due Diſpenſation of that Fluid, without the Miniſtry of which the noble Succeſſion of Bodies we behold, Animals, Vegetables and Minerals, would be all at a ſtand.

But to keep to Plants. 'Tis manifeſt, Water, as well on this, as upon the other Hypotheſis, is abſolutely neceſſary in the Affair of Vegetation, and it will not ſucceed without it; which indeed gave occaſion to the Opinion, that Water it ſelf nouriſhed, and was changed into Vegetable Bodies: They ſaw tho' theſe were planted in a Soil never ſo rich, ſo happy, ſo advantageous, nothing came of it, unleſs there was Water too in conſiderable Quantity. And it muſt be allowed, Vegetables will not come on or proſper where *that* is wanting: But yet what thoſe Gentlemen inferred thence was not, we ſee, well grounded.

This Fluid is capacitated for the Office here aſſigned it, ſeveral ways. By the Figure of its Parts, which (as appears from many Experiments) is exactly and mathematically *Spherical*, their Surfaces being perfectly *polite*, and without any the leaſt Inequalities. 'Tis evident, Corpuſcles of ſuch a Figure are eaſily ſuſceptible of Motion; yea, far above any others whatever; and conſequently the moſt capable of moving and conveying other Matter that is not ſo active and voluble. Then the Intervals of Bodies of that Figure are, with reſpect to their Bulk, of all other the largeſt, and ſo the moſt fitted to receive and entertain foreign Matter in them. Beſides, as the Trials hitherto made, inform us, the conſtituent Corpuſcles of Water are each ſingly conſidered abſolutely ſolid, and do not yield to the greateſt external Force. This ſecures their Figure againſt any Alteration; and the Intervals of the Corpuſcles muſt be always alike. By the *latter* it will be ever diſpoſed to receive Matter into it; and by the *former*, when once received, to bear it on along with it.

Water is further capacitated to be a Vehicle to this *Matter* by the Tenuity and Fineneſs of the Corpuſcles of which it conſiſts. We hardly know any Fluid in all Nature, except *Fire*, whoſe conſtituent Parts are ſo exceeding ſubtle and ſmall as thoſe of Water are. They will paſs Pores and Interſtices, that neither Air nor any other Fluid will. This enables them to enter the fineſt Tubes and Veſſels of Plants, and to introduce the Terreſtrial Matter, conveying it to all Parts of them; which each, by Means of Organs it is endued with to that Purpoſe, intercepts and aſſumes into itſelf ſuch Particles as are ſuitable to its own Nature, letting the reſt paſs on thro' the common Ducts. Nay, we have almoſt every where mechanical Inſtances of much the ſame Tenor. 'Tis obvious to every one, how eaſily and ſuddenly Humidity, or the Corpuſcles of Water ſuſtained in the Air, pervade and inſinuate themſelves into Cords however tightly twiſted, into Leather, Parchment, Vegetable Bodies, Wood, and the like. This it is that fits them for *Hygrometers*, and to meaſure and determine the different Quantities of Moiſture in the Air, in different Places and Seaſons. How freely Water paſſes and carries with it Terreſtrial Matter, thro' *Filters*, *Colatures*, *Diſtillations*, hath been intimated already.

Obſervation VIII. *Water is not capable of performing this Office to Plants, unleſs aſſiſted by a due Quantity of Heat ; and this muſt concur, or Vegetation will not ſucceed.*

The Plants that were ſet in the Glaſſes Q, R, S, *&c.* in *October*, and the following colder Months, had not near the Quantity of Water ſent up into them, or ſo great an additional Encreaſe by much, as thoſe that were ſet in *June* and *July*, and the hotter Months. 'Tis plain, Water has no Power of moving it ſelf, or riſing to the vaſt Height it doth in the more tall and lofty Plants; ſo far from this, that it doth not appear from any Diſcovery yet made, that even its own Fluidity conſiſts in the inteſtine Motion of its Parts; whatever ſome, otherwiſe very learned and knowing Perſons, may have thought. There is no need of any thing more for ſolving all the Phænomena of Fluidity, than ſuch a Figure and Diſpoſition of the Parts as Water has. Corpuſcles of that Make, and that are all abſolutely Spherical, muſt ſtand ſo very tickly and nicely upon each other, as to be ſuſceptible of every Impreſſion; and tho' not perpetually in Motion, yet muſt be ever ready and liable to be put into it, by any the ſlighteſt Force imaginable. It is true, the Parts of Fire or Heat are not capable of moving themſelves, any more than thoſe of Water; but they are more *ſubtile*, *light* and *active* than thoſe are, and ſo more eaſily put in Motion. In fine, it is evident and Matter of Fact, that *Heat* does operate upon and move the *Water* in order to its carrying on the Work of Vegetation; but how it is agitated it ſelf, and where the Motion firſt begins, this is no fit Place to enquire

That the Concourſe of Heat in this Work is really neceſſary, appears not only from the Experiments before us, but from all Nature: From our Fields and Foreſts, our Gardens and our Orchards. We ſee in Autumn, as the Sun's Power grows gradually leſs and leſs, ſo its Effect on Plants is remitted, and their Vegetation ſlackens by little and little. Its Failure is firſt diſcernible in Trees: Theſe are raiſed higheſt above the Earth, and require a more intenſe Heat to elevate the Water charged with their Nouriſhment to the Tops and Extremities of them; ſo that for want of freſh Support and Nutriment, they ſhed their Leaves, unleſs ſecured by a very firm and hardy Conſtitution indeed, as our *Ever-Greens* are. Next, the Shrubs part with theirs, and then the Herbs and lower Tribes; the Heat being at length not ſufficient to ſupply even theſe, tho' ſo near the Earth the Fund of their Nouriſhment. As the *Heat* returns the ſucceeding Spring, they all recruit again, and are furniſhed with freſh Supplies and Verdure. But firſt thoſe which are loweſt and neareſt the Earth, *Herbs*, and they that require a leſs Degree of Heat to raiſe the Water with its earthy Charge into them: Then the *Shrubs* and higher Vegetables in their turns; and laſtly, the *Trees*. As the Heat increaſes it grows too powerful, and hurries the Matter with too great Rapidity thro' the finer and more tender Plants. Theſe therefore go off and decay; and others that are more hardy and vigorous, and require a greater Share of Heat, ſucceed in their Order. By which Mechaniſm, provident Nature furniſhes us with a very various and differing Entertainment, and what is beſt ſuited to each Seaſon all the Year round.

As the Heat of the ſeveral Seaſons affords us a different Face of Things, ſo the ſeveral diſtant Climates ſhew different Scenes of Nature and Productions of the Earth. The hotter Countries yield ordinarily the largeſt and talleſt Trees, and thoſe too in much greater Variety than the colder ever do. Even thoſe Plants, which are common to Both, attain to a much greater Bulk in the *Southern* than in the *Northern* Clime. Nay, there are ſome Regions ſo *bleak* and *chill*, that they raiſe no Vegetables at all to any conſiderable Size. This we learn from *Greenland*, from *Iſland*, and other Places of like cold Site and Condition. In theſe no *Tree* ever appears, and the very *Shrubs* they afford are *few*, *little* and *low*.

Thus far this great Philoſopher and ingenious Author, Dr. *Woodward*; who, in explaining the Nature of Vegetation, has perhaps ſaid more, at leaſt more to the Purpoſe, in that ſmall Treatiſe, than is to be found in all the voluminous Authors on that Subject, not excepting Mr. *Evelyn* himſelf. I was willing therefore here to recite his Obſervations and Reaſonings, even as they now preſent themſelves to the World; hoping yet, ſome time or other, that ſuperior Genius will, as his Affairs may ſuffer, oblige the World with ſome further Enlargement on the Subject, as the Doctor has been ſo good as to make me hope he will, in a late Letter to my ſelf.

In the mean Time, altho' it is a very undeſirable Thing to differ in Sentiment from ſo good a Reaſoner and nice Obſerver of Vegetable Nature; yet I know the Doctor's Goodneſs will excuſe me, if I am forced to ſay, I cannot altogether *give in* to ſome Parts of the aforegoing Propoſitions, at leaſt as they ſtand there explained.

In Obſervation III. where a Reaſon is given why only a *great Part* of the Terreſtrial Matter aſcends up into the Plant, and that *all of it* cannot, becauſe he thinks the *Mineral* Matter not only too *groſs* and *ponderous*, but *ſcabrous* and *inflexible*; he proceeds further on to illuſtrate this, by explaining the Nature of *Lime*, *viz.* that it doth not *fatten*, but only *mellow* the Ground; containing nothing in itſelf of the ſame Nature with the Vegetable Mould, or affording any Matter fit for the Formation of Plants, but merely *ſoftens* and *relaxes* the Earth.

It is indeed the Nature of Lime, when it is firſt *ſlaked*, to open and relax whatever it is mixt with; but it is well known that that ſudden Power of Relaxation is ſoon over, and preſently obtains a quite contrary Quality of *binding* and *contracting* every thing it is mixt with, to itſelf. And indeed, the Art and Practice of the Husbandman is founded upon this very Principle and Reaſon, that the mixing Things of the moſt contrary Natures, and which moſt cauſe *Relaxation*, is the Life of Vegetation. Accordingly they never chuſe *Lime* for Clays; which are the Soils, if any, that want Opening and Relaxation. So far from that, that they reckon (at leaſt after a Year or two) it doth more harm than good, by *ſaddening* and making the Soil more *untractable.* The Soils, where *Lime* is juſtly and with reaſon eſteemed a proper and ſuitable Manure, are *ſandy*, *gravelly*, or other *light* mixt and mellow Soils: ſuch as do not want *Opening* and *Relaxation*; but, on the contrary, want *Tenacity*, and to be made *heavier* and more *binding*.

For the ſame purpoſe alſo are uſed *Chalk* and *Marle*, not to *looſen*, but to *ſadden* the Soil and hold it together, that the Rain may not ſink too ſoon away, nor be too ſoon exhauſted by the Heat of the Sun. Accordingly *Theſe* alſo are by Experience found in a wonderful manner to anſwer the Husbandman's Hopes, by a long and continued Enrichment of the Soil diſcreetly choſen; even of ſuch Soils as have not wanted Opening and Relaxation, (having been of themſelves rather too light,) but were become *ſteril* and deſtitute of a proper nutritive Matter fit for Vegetation.

Theſe Obſervations, founded upon Practice and Experience, I think, demonſtratively prove ſomething *more* and *other* than what the Doctor is willing to allow to the Power and Force of *Lime.* That *Lime* is a *Manure*, and an excellent one too, laid on a proper Soil, we are both agreed; but we differ as to the Effects of its Operation. And if the Doctor had not too ſtrictly confined himſelf to an Opinion, that nothing but *Vegetable* Subſtances, refunded back again into the Earth, are proper Manures, and ſerve for the Formation of other like Bodies, his Doctrine in the main would have ſtood perfectly right; only by allowing that the Aſhes or Salts of *Minerals*, or the Minute and Terreſtrial Parts of *Mineral Bodies*, are alſo a proper Food for Vegetables.

This Suppoſition will appear more rational and probable, by what I ſhall ſay in the Sequel of another Obſervation I have to make on what the Doctor hath been pleaſed to ſay toward the End of his laſt Propoſition, with reſpect to the Effects of *Heat*, viz. *That thoſe Plants which are common to both hot and cold Countries, attain to a much greater Bulk in the Southern than in the Northern Clime.* This, I doubt, will be found to be indefenſible, as carrying the Virtue and Power of *Heat* beyond its Strength, and further than Experience will confirm. We do not find, for inſtance, that the *Oak* and *Aſh* and *Elm* (Trees common to both hot and cold Countries) do obſerve any ſuch Proportion. So far from that, that the Stature and Bulk of an *Engliſh* Oak eſpecially, (ſuch as I have mentioned under that Article of *Foreſt-Trees*) is juſtly ſurpriſing, and not to be paralleled in hotter Countries. As far as my Obſervation has gone in this Matter, the Productions of Nature in the Growth and Increaſe of Trees are commonly anſwerable, (not to the *Heat* and *Cold* of Climates, but) to the *Situation* and *Soil* wherein they are planted, agreeable to the Nature and Conſtitution of each reſpective Tree.

We need not go further for a Proof of this than *Scotland* or *Norway*, where the *Firs* of all Kinds are known to proſper to admiration; and accordingly from thence are fetched the *beſt*, the *moſt*, and the *largeſt* Trees. *Firs* will grow in *Italy* and *Spain*, and there make fine and handſome Trees, if the Soil and Situation be ſuited to their Nature; otherwiſe they ſoon become dwarfiſh and ſtunted in their Growth, and diſcover many Indications of their Diſlike and ill Health: And even at the beſt, and under the moſt deſireable Circumſtances of a well-choſen Place, they are far from being able to vye with the Productions of the

North, either as to the Goodneſs or Largeneſs of the Timber. The Reaſon of all which I take to be this; that *too much Heat in many Caſes is as injurious to Vegetation as too much Cold.*

As to Trees and Plants that bear Fruit, there may be ſome Shew of Reaſon to ſupport the Doctor's Obſervation; becauſe the Heat of the Sun and Clime is, in the general, ſo neceſſary for the ripening the beſt Fruits, and bringing them to Perfection: But even here (if it be rightly conſidered) the Propoſition will not hold as to the *Bulk* of Trees common to both *North* and *South.* I cannot call *Vines*, *Peaches*, *Figs*, *&c.* Plants common to *both*; for they are of a *Southern* Original and Extraction, and are nurſed *here* with Care and Art, that we may be rewarded with their Fruits, which want their native Sun: But the Trees and Plants themſelves (tho' Foreigners) do not even diſcover any Want of Heat to explain their Productions. However, the Compariſon ought to be made of Fruit-Trees that are plainly common to *both* Climates; ſuch as are *Pears*, *Apples*, *Plums*, &c. and *theſe* are not obſerved to grow bigger in *Italy* or *Spain* than in *England*; but rather the contrary, from the Reaſon above.

But to return to the Productions of Nature in Foreſt-Trees. It is almoſt unaccountable how *Elms* and *Aſhes* in *England*, and *Firs* in *Scotland* and *Norway*, will grow; and to what a Bulk and Height they will arrive, even on *barren Rocks*, where their Roots are obſerved to extend themſelves, and to find out their difficult Paſſage thro' the narrow Clefts and Crevices thereof, to fetch Nouriſhment for their Augment and Support. It cannot well be imagined, that here is ordinarily to be found *common Terreſtrial* Matter ſufficient for ſuch large Productions. The opening ſuch Rocks, and following the Meanders and Windings of ſuch Roots and Fibres, diſcover little Foundation for ſuch a Suppoſition. I can therefore ſee no Reaſon to hinder the Belief, that ſuch Trees fetch their Support and derive their Nouriſhment from *Mineral* Matter; from ſuch Exſudations, Salts, and minute Parts of *Minerals*, as are proper to be conveyed by the Help of Water thro' the Veſſels of Plants.

I ſhall always be willing to be ſet right by any ſuperior Genius: But by what I have obſerved and ſaid above of the Natures of *Lime*, *Marle* and *Chalk*, and have here remarked concerning *Aſhes*, *Elms* and *Firs*, growing on barren Rocks; I am inclined to think that the Aſhes or minute Parts of ſome *Minerals* unformed, are equally ſerviceable for Vegetation with the minute Parts of Terreſtrial Matter fetched from Vegetables. As to the Objection, that Mineral Matter is too ponderous and inflexible to be conveyed thro' the Veſſels of Plants; *that* may be of ſome Force with reſpect to the heavier and harder Sorts, as Iron, Lead, Copper, *&c.* but can be of little with reſpect to *Stone*, *Marle*, and *Chalk* pulverized; which need not be imagined more *angular* or unfit to enter the Pores of Plants, than Terreſtrial Matter it ſelf.

Thus far I have thought fit to remark, to clear up a little further the Vegetable Syſtem; but yet with great Submiſſion and Reſpect to Dr. *Woodward*'s ſecond Thoughts. However, in the mean time, I would have it be obſerved here, That the Doctor's main Propoſitions and Reaſonings thereupon ſtand yet firm and unſhaken, *viz.* That a great Part of the Terreſtrial Matter mixt with the Water, aſcends up into a Plant as well as the Water: That a Plant is more or leſs nouriſhed, in proportion as the Water in which it ſtands contains a greater or ſmaller Quantity of Terreſtrial Matter: And therefore, That Terreſtrial *Matter*, not *Water*, is the Subject to which Plants owe their Increaſe: But yet, That both Water and Heat are abſolutely neceſſary to put all in Motion for the purpoſe of Vegetation: And finally, That even Nitre it ſelf is no otherwiſe eſſential to Plants, but only to looſen and ſeparate the Parts of Earth, ſo as to diſpoſe them to be carried into the Seed or Plant for its Formation and Increaſe.

But this being a Matter hitherto *tenderly* touched, talked of by all Writers only in Generals and ambiguous Expreſſions; and wherein I own my ſelf to have ſome Doubts, and to be yet not perfectly clear; I was willing to have the Opinion and Philoſophical Reaſonings of an ingenious and learned Friend, who needs no other Encomium but his own Reaſonings.

And becauſe he has been ſo good as to ſuffer me to make uſe of his Sentiments, I ſhall here lay them before the Reader, as they were kindly communicated to me in his Letter, which came to me after I had ſhewn him the Remarks above; and I think they do not need the modeſt Apology he made.

Dear Sir,

'I Have read your Obſervations on Dr. *Woodward*, and am pleaſed ' to obſerve, that the Difference between you in the grand Point, ' is, like moſt other Diſputes, chiefly *Verbal*. If you mean by *Mineral* ' Matter, only Matter contained in the Bowels of the Earth, that never ' had been Parts of Plants; I readily agree, that vaſt Quantities of ſuch ' are mixt in the Earth, and with the groſſeſt Minerals, fit to aſſimulate ' themſelves with Vegetables; nay, that perhaps Metals and Stones are ' not free from them; but when their Fumes are drawn off by Fire, ' theſe may perhaps be found to contain no ſmall Quantities. All *Marles* ' and *Chalks* abound with them; and every Thing which the Rain can ' penetrate will be repleted with theſe Particles. But then theſe Particles ' are as diſtinct in their Nature from Stone, or any Mineral Subſtance, as ' Gold is from Cryſtal, or the two moſt oppoſite Things which are ' lodged in the Earth; and they differ no more from the Parts of Plants, ' than new Bricks fit for Building do from thoſe which were once united ' in the Form of an Houſe. Your Argument to prove your Propoſition, ' from the vaſt Bulk to which Trees will grow on Rocks and barren ' Places only; I think makes it evident, that they receive their Nouriſhment not from the Soil that ſupports them, but from the *Vegetable* ' Subſtance with which the Dews and Rains are repleted. Thus the ' * *Sedum arboreſcens* will grow to a large Bulk, and flouriſh like a Camelion on the *Luxury* of the Air; for when tied up in a String, it ' extends its Roots to ſuck the fattening Moiſture from far, and ſupports ' its bulky Leaves in Vigour on that *thin* Diet. So your Vine †, which ' from the Crevices of a Caſtle-Wall poured forth yearly a Vintage, ' gave only what the floating Moiſture, with the Vegetable Materials ' ſuſpended in it, enriched it with. And I ſhall conſtantly believe this, ' till ſome Experiments ſhew that the ſmall Particles of any Mineral can ' be drawn from Plants by a chymical Analyſis, excepting perhaps Sulphur, whoſe Parts are ſo thin and volatile, that they may be carried up, and unite with the Parts of Plants, and be retained in Fruits.

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* *Moſt bulbous rooted Plants will do the ſame,* viz. *Onions, Tulips, Tuberoſe,* &c.

† *See* Clergyman's Recreation.

‘ If Gold was ſuſpended inviſibly in *Aqua regia*, and any proper Precipitate in Ramifications was extended thro’ the Fluid to collect the flying Gold, and gather it again into a viſible Maſs, it would repreſent my Sentiments exactly: For you ſee, that in this Caſe nothing but Gold would be united with this Kind of Vegetation; ſo nothing but the Subſtance of the Plant-Materials in the other. But I think this is only a Diſpute about Words; what you call *Mineral* Subſtance, we more intelligibly, and I think more reaſonably, contend is the ſame Sort of Subſtance with the Plants, lodged with the Minerals.

‘ As to another Point indeed, I differ from you *toto cœlo:* Fermentation is not only *not* the Life of Vegetables, but it is the ſure unavoidable Death of them. Fermentation is that which will diſunite the Parts, and ſeparate them from each other; and when that Separation is performed, then indeed they are fit to be put together again: As when you pull to pieces an old Houſe, the Materials are fit to be employed again; but the pulling down is not the Life of Architecture. The Heat which Fermentation cauſes indeed, will act and aſſiſt in Vegetation like all other Heat; and if that Heat ſends forth Steams of well diſunited Particles, it will enrich the Earth thro’ which it percolates with proper Materials and Food for Plants; but whilſt the Fermentation continues, and in the Place where it actually is, Plants would be abſolutely deſtroyed by its violent Motion.

‘ You mention the mingling of Contraries as the preſumptive Cauſe of Fermentation. What the Cauſe of that ſurpriſing Power is, I am as ignorant as I am what is the Cauſe of *Gravity* or *Elaſticity:* Neither *Friend* nor any other ſatisfy me: But that Things being merely contrary to each other cauſes *not always* Fermentation, is moſt evident; and that Things which are by no means contrary to each other will ferment, is every Day's Experience. This Philoſophical Age therefore will not reliſh the common Expreſſions of *Contrary Things raiſing a Buſtle and Ferment*; becauſe *theſe* give no clear Ideas of any efficient Cauſe to the Mind which ſatisfieth. Fermentation is properly the Life (if I may call it ſo) of one of the Three old Principles which the Followers of *Ariſtotle* ſaid went to the Compoſition of all Things; *Materia, Forma & Privatio.* The *Laſt* indeed is almoſt wholly owing to it; Bodies not often putting off one Form to aſſume a ſecond, but by its Aſſiſtance.

‘ I muſt confeſs, I think you in the right to queſtion that Fact, *That Vegetables common to all Climates are better always in hot than cold Countries*; if it is true, that any Plants may be ſaid to be naturally common to very diſtant Climates: And my Reaſon for it is this, That the vaſt Heat may make in ſome ſuch a large Perſpiration and Hurry of Juices; which, tho’ they can *live under*, they cannot *thrive with.* But I doubt whether all Plants, tho’ they will ſupport every Degree of Heat, want not a *certain one* to attain their Perfection: tho’ it muſt be owned that many Plants, as *Wheat*, *&c.* are vaſtly plumper and whiter in *Southern* than *Northern* Harveſts; and the Taſte of others (as *Onions*) more luſcious, and the Size more large.

‘ As to your Inſtances, two Things muſt be obſerved: That Firs of *Southern* Mountains and the *Northern* are not Trees of the ſame Kind,

‘ tho’ the ſame Name; the *Silver* and *Spruce* greatly differing: That the ‘ Climates in Heat do not differ ſo much, as in Denomination; for eter- ‘ nal Snows cover the Brows of the *Alps*, where *Firs* flouriſh to a moſt ‘ gigantick Size, as well as the Hills of *Norweigh*.

‘ To come now to the grand Point, the Nature and Force of *Lime*. ‘ But how ſhall we determine this Diſpute, when we do not agree in the ‘ *Facts?* You ſay, that *Lime* is not proper for Clay-Land, according to ‘ your Hypotheſis; *Woodward* ſaith, it is not proper for Sand and light ‘ Soils, according to his Hypotheſis: But Farmers ſhake their Heads at ‘ you *Both*, and conſtantly employ it in *both* Kinds in this very Country; ‘ but in *Devonſhire* moſtly in Clay-Soils, Sand and Lime being judged ‘ proper Manures for the ſame Land. *Lime* is nothing but Stone burnt ‘ in Fire to a very great Degree, thoroughly ſated with the Flames in ‘ which it had ſo long lain. *Water* breaks the Parts of the Stone, which ‘ hung but tenderly together, and ſuffers the Fire by that means to meet ‘ and unite. The Activity of the *Lime* is owing to the actual Fire; and ‘ the Parts of the Stone act like other hard yet ſpongy Subſtances, as ‘ an Abſorbent: It is known to *tear* every Thing to pieces it is mingled ‘ with at firſt; but the minute Parts of the Lime, when the Fire is ſepa- ‘ rated from them, have ſo ſtrong an Attraction, as to unite together ‘ again as ſoon as the Moiſture by its own Heat and Time is evaporated, ‘ and encloſe any Thing that is mingled with it, unleſs it is joined in ſo ‘ large a Quantity as to keep the Parts at too great a Diſtance that they ‘ cannot join to each other; and by that means their uniting with the ‘ Materials neareſt them deſtroys the Union which before was between ‘ the Parts of Clay it ſelf, and conſequently *crumble* it.

‘ Thus you ſee, Sir, how poſſible it is, for the ſame Thing to form ‘ Mortar, mixt with a little Sand; to crumble Clay, when a little of it is ‘ joined to a great Quantity of the ſticky Soil; and to bind the ſandy ‘ Soil, by making an Union between Parts where there was none before. ‘ When it crumbles Clay, it by that means ſuffers the Rain with its Riches ‘ to penetrate every Part, and makes way for the tender Fibres to follow ‘ after it.

‘ You rightly explain the Benefit ſandy Soil receives from it, by hin- ‘ dering the Water from running thro’ it, without lodging its proper Se- ‘ diment amongſt it; to ſtiffen it to ſupport Plants; and ſuch like good ‘ Effects. Beſides theſe Benefits from *Lime*, many others belong to it. ‘ Its Heat may aſſiſt Vegetation in all Kinds of Land greatly. Heat may ‘ remain enough to actuate Steams, tho’ it is lower in Degree than to ‘ affect our Senſes. Fire will not leave the Stone Particles, to which ‘ it was ſo intimately united, *intirely*, probably for ever. And if Fire ‘ (for Fire is not meerly a Quality common to all Subſtances, but a Fluid ‘ of its own Kind) is there, its active Virtue will be there alſo.

‘ As to *Marle*, the Virtues are as various as its Kinds. Some contains ‘ prodigious Quantities of Vegetable Matter which it gained from Rain, ‘ which Age after Age penetrated it; which immediately on becoming ‘ dry would admit no Vegetable to enter and rob it of the Treaſure: ‘ Some of it, when conſtantly expoſed to Air and Rain, and crumbled ‘ amidſt Earth, turns to a ſofter Sand: Some contains very oily Particles ‘ mixt with Salts, (as *Fullers Earth:*) Some contains Fire alſo, as ‘ *Chalk*; for I have known a Beam fixed in Chalk burnt to a Coal, as ‘ if placed in unextinguiſhed Cinders. Thus, *Sir*, you ſee how *theſe* 'may, by diſcreet Uſe, be capable of improving moſt amazingly all 'Kinds of Soils. I have tired you with this long and haſty Anſwer. 'But I am ſo ſatisfied with what I have ſaid about *Lime*, that I am per'ſuaded a very great Light may be thrown on the Whole of Husbandry 'from theſe Principles, drawn out at length and explained; for there is 'nothing but what is moſt agreeable to Experience and true Philoſophy; 'it is clear and ſatisfactory to the Mind, and uſeful in Practice: And '*Lime* thus explained acts in *Surgery*, in *Medicine*, and *Husbandry*, by 'the ſame Principles. Uſe the Principles in this Letter as you pleaſe; 'the Letter it ſelf is writ in too great an Hurry to be regarded by any 'but one who is willing to pardon all Faults in his

Affectionate Friend.

'*P. S.* I can hardly forbear explaining more at large the Nature of '*Lime*; and ſhew you, that its Compoſition is a *fixed Salt*, and an ab'ſorbent *Earth*, and *Fire* both united to and encloſed between the Parts 'of the other two; and convince you that it is poſſible, nay, that it 'muſt neceſſarily perform All I have attributed to it; and conſequently 'ſhew how it becomes ſo excellent a Manure. But it is too long to un'dertake in ſuch a manner, as to deduce it from the firſt Principles of ge'nuine Philoſophy, without knowing whether it will be uſeful to you, 'which alone can make it acceptable. Only this eaſy Experiment care'fully tried would convince the moſt obſtinate. Take 50 Pound Weight 'of ſticky Clay, and mingle with it 8 Pound Weight of powdered Quick'Lime, with a due Quantity of Water to make them incorporate: Beat 'theſe together in a paved Court, expoſed to the Weather; Mortar will not 'be made by it, but the Clay will become diſunited, looſe, and crumble, 'and continue ſo, till Rain paſſing thro' it drains away all the Lime. At 'the ſame time, in another Part of the Court, mingle the ſame Weight 'of Lime with the ſame Quantity of *ſandy looſe* Soil, 8 with 50; ſtir 'them together with Water, and you'll find the Sand clot and grow more 'connected, and become a firmer Soil by it. And ſuch contrary Phæ'nomena being explained by the ſame Principles, give a great Sanction 'and Authority to the Principles themſelves.

The ANSWER *to the aforegoing* LETTER.

Dear Sir,

'YOU are extremely good in ſo freely communicating your Thoughts 'to one, who always ſets ſo high a Value upon them. You have 'acted the Part of a right Mediator betwixt Dr. *Woodward* and my ſelf, 'in your Explanation of *Mineral* Matter. Only I am apt to think (and 'we can but gueſs) that there are, beſides Terreſtrial Matter, among 'the barren Rocks, and amidſt the deep Crevices of bulky Stones, 'ſome ſuch Exſudations and unformed Mineral Matter, (for that Minerals 'grow I do not in the leaſt doubt) as unite themſelves to the fibrous 'Roots of Plants and Trees for their Support, and otherwiſe unaccount'able Magnitude.

'When I ſay *ſometimes*, and in ſome Caſes, that Fermentation is the '*Life* and *Cauſe* of Vegetation, and *always* that it is a great *Help* to it; 'it is to be underſtood of a Fermentation already performed, or of ſuch 'an one as ſupplies the Defect of natural Heat. There is an immediate 'Cauſe, a remote Cauſe, an efficient Cauſe, and a *Cauſa ſine quâ non.* 'And this laſt is the Cauſe I had in my Eye, and is a true one.

'I ſhall not at preſent (Time will not ſuffer me) ſay any thing againſt 'your ingenious philoſophical Reaſoning about the Nature and Operations 'of Lime: Philoſophy is very pretty; but never to be depended upon, 'till confirmed, or not contradicted, by Experience and Facts. The Ambiguity of the Word *Clay* led your Farmers to ſmile, and your ſelf to 'think that Lime was proper Manure for all Clays; whereas there is al'moſt as much Difference betwixt one Clay and another, as there is be'twixt Gravel and Clay. Some Clays are of that eaſy tractable Nature, 'that they will of themſelves *fall* aſunder (when turned up) with Rain 'and Weather; and ſuch are much mended with Lime: But there are 'others (and thoſe the moſt frequent) of that ſtiff, ſour, wet, untracta'ble Nature, that nothing but Sand, Coal, Aſhes, &c. will ſeparate their 'Parts, at leaſt that will leave any abiding Effects.

'I could ſhew you, even in my own Pariſh here, the melancholy 'Sight of many Acres of Ground quite ruined and ſpoiled by *Lime*; ſo 'that with all the laborious Diligence of applying ſeaſonable and ſuffici'ent Quantities of Lime, it would bear no Corn, and now it is laid 'down, it will hardly bear a Spire of Graſs; inſomuch, that it is not to 'be recovered, but by a long Courſe of better Husbandry of Sea-Sand 'and Coal-Aſhes, &c. which has begun already to reſtore ſome Parts, 'and to expel the Poiſon.

'I have had Thirty Years Experience of theſe Things; and am ſo ſure 'that my Facts are right, that tho' I love Reaſoning ſhould go along with 'Experience, yet when the *Former* is ſeparated from the *Latter*, I ſhall 'believe that Lime is *bad* for ſtiff untractable Clays. What Farmers of'ten call Clays, are either more properly *loamy Soils*, where the Clay 'lieth twelve or fourteen Inches under the Surface, or elſe are inclinable 'to *Marle* or *Chalk*; *both* which eaſily *fall*, and when worn out, are 'mended with Lime.

'Not but that, by ſuch an Experiment as you mention, even the worſt 'of Clays, by tampering them with a Quantity of *quick* Lime, may be 'opened, and their Parts looſened for the preſent by the active Parts of 'new Lime; but thoſe *active* Parts ſoon, too ſoon, become *paſſive*, and 'are in Time meer *dead* Lumps of Earth, cold, heavy, ſtiff, and un'tractable.

'And the very ſame Effects muſt be expected from Clay Land, where 'the Superinductions of Lime have been conſiderable, and frequently re'peated; it will every Year grow worſe and worſe, till even the *active* 'Parts of Fire and Salt in the Lime will do it no good, but leave it a ſte'ril unactive Lump, fit for nothing but to hold Water like a Baſon. When 'I receive the Favour of your next, poſſibly I may have an Opportunity 'to ſay ſomething further on this Point. In the mean Time, I am,

Dear SIR,

Yours affectionately,

J. LAVRENCE.

The

The ANSWER.

Dear Sir,

'AS to the Diſpute between us, I ſtill continue of the ſame Opinion: ' If you mean by Exſudations of unformed Mineral Matter amongſt ' Rocks, nothing but that Vegetable Matter which may be brought up ' thro' the Crevices and Cracks with the aſcending Steams, which internal ' Heat ſublimes, I will not deny the Probability: But then I would not chuſe ' to expreſs the true Idea by Words, which all philoſophical People will imagine ' convey the contrary Opinion; but would call every thing which ' is capable to be carried into the Veſſels of Plants by Water to encreaſe ' their Bulk, *Vegetable Subſtance*, or *Salts*; meaning by *Salts*, what ' the Chymiſts do, every thing eaſily diſſoluble in Water, till it is diſperſed ' thro' it, and becomes inviſible. And then, whether theſe were originally ' lodged in the Interſtices of Rocks, or brought up thither by ' Fumes ariſing from the Heat in the Bowels of the Earth; or whether ' mingled with Loam, Sand, Clay, or any other Subſtance at firſt; or ' by the Corruption of old *Vegetables* or *Animals*, (which by feeding ' on them are of the ſame Nature,) are returned to theſe again from ' whence they were drawn; it is all one: If there, they will encreaſe ' the Bulk of the Plants; and without it, the Plants can never thrive.

' As to Fermentation, I am glad we ſo far agree, that it is only neceſſary ' to prepare the Materials for Vegetation, or ſometimes by its Heat ' ſupply the Abſence of other Warmth: And if we agree in the Thing, ' methinks we ſhould agree in the Expreſſions alſo, that People may not ' be led into Miſtakes about it. The *Cauſa ſine quâ non's* are quite out ' of Faſhion, and ſeldom come into the Heads of any who are unacquainted ' with School-Philoſophy; and for the Admirers of that Philoſophy, ' you ſcorn to write. Fermentation aſſiſts, perhaps wholly cauſes, ' Corruption; and conſequently, by ſeparating the Parts, makes them ' proper to be again ſuſpended in Water, and percolate thro' the fine ' Strainers of the Roots: If the Fermentation hath not produced its ' perfect Work, and yet the Maſs is forced by more than common Heat, ' which relaxes and dilates the ſlender Channels or Tubes of the Vegetables ' to paſs into them, they flouriſh with a ſickly Vigour, loſe their ' own proper Flavour, and taſte of the very Compoſts out of which they ' grew; witneſs the *Aſparagus* on Hot Beds, and the Dung which gives ' a Taint to all the Plants which are *compelled* to grow in it.

' Fermentation therefore is highly neceſſary to reduce into the original ' Particles the old waſte decaying Vegetables, and to prepare the Materials ' to be employed a ſecond Time to build up Plants. Fermentation ' may aſſiſt alſo to break and crumble the Clods of Earth, to let the ' Rain and Fibres of Plants penetrate them to ſuck up the fattening ' Moiſture.

' I again confeſs, that I am ignorant of the Cauſe of this great Power, ' whoſe Effects are aſtoniſhing, as much as I am of *Elaſticity* or *Attraction*; ' tho' perhaps it is nothing but a Modification of thoſe Two conjoined, ' acting on and exciting the Fluid of Fire, which pervades and is ' contain'd in every Maſs. *Freind* and his Followers are unſatisfactorily ' ingenious in their Attempts to deduce it from thoſe two Principles, ' without taking in this Fluid. The Attraction of the ſmall Particles is

‘ the Cauſe of Coheſion; this Fluid of Diſſolution, when it it is ſo mo-‘ ved that its Expanſion overcomes the Power of the other.

‘ Now for *Lime*, where I ſtill think I am right, and can account for ‘ every Fact you mention from my Principles. I have ſince talk'd with ‘ moſt notable Farmers, who confirm what you obſerve, and yet agree ‘ with me. No Clay (ſay they) is ſo ſtiff and ſour, but it will grow ‘ tender and mellow by Lime; but after three or four Years, the Ten-‘ derneſs will go off; and if you lay it down with the Lime, it will ‘ be harder than ever, and nothing will grow on it. This is the very ‘ Thing I ſhould expect: Lime by joining its fixt Mineral Salts with ‘ Particles of the Clay, diſunites them from each other, and gives leave ‘ for Rain to mix with it, and diſſolve and ſuſpend all the Vegetable Mat-‘ ter which was impriſoned in its Bowels: But by Time, the Rains car-‘ rying away the Parts of Lime, which had thus ſeparated the Clay, the ‘ Parts of Clay more ſtrongly unite, by having all the Mixture of Loam and ‘ Vegetable Subſtance robb'd from it, and thus becomes harder and ſtiffer ‘ than before, and nothing can penetrate its Parts, or if it could, a ſingle ‘ Blade of Graſs muſt be ſtarved there.

‘ But if while the Lime had thus broken the Union of the Parts of the ‘ Clay, Sand and Coal-Aſhes and Parts of old Bricks or Manure, as ‘ Rags, (which acts the two Parts in Improvements,) or any Vegetable ‘ Subſtance, was mingled to keep it hollow and enrich it, then the Rain ‘ and Dew would have continually brought new Treaſures to it, and made ‘ it excellent Soil. Thus then in ſtiff Clay, a proper Mixture of Lime, at ‘ firſt breaking up, will be highly beneficial; but it will ruin the Land, ‘ if laid down again without ſome other Aid and Aſſiſtance. This Philo-‘ ſophy teacheth, and Experience confirms. *Lime* alſo aſſiſts in diſſolving ‘ Dung and Vegetable Subſtances the ſooner; ſo Undertakers mingle it in ‘ large Quantities in Coffins to deſtroy and rot the Bodies. So far for Hus-‘ bandry. I offer theſe Thoughts to your Conſideration, becauſe I deſire ‘ that your Work ſhould give no Offence to the philoſophical Gentlemen, ‘ who will expect from you not *Fact* only, but the *Reaſons* of the *Facts*, ‘ in a clear intelligible Manner, ſupported by the beſt and unconteſtable ‘ Principles of the beſt and genuine Philoſophy. People will expect the ‘ acute Philoſopher, as well as the experienced Husbandman, from one ‘ of your Character. I add no further, but an Aſſurance that I am

Your moſt Affectionate, &c.

The ANSWER.

Dear Sir,

‘ I Think moſt of our ſeeming Differences are adjuſted, except about ‘ the Powers and Effects of *Lime*; in which I cannot be clear, but ‘ by adhering to what I firſt laid down as a Maxim ſupported by Expe-‘ rience, and no way contrary to Reaſon or true Philoſophy, That *Lime*, ‘ tho' it be *good* for light Soils, is *bad* for binding Clays; becauſe tho' ‘ Quick Lime hath by its *Fire* and *Salts* the Power of Relaxation, yet ‘ foraſmuch as it ſoon obtains (agreeably to your own Principles) a quite ‘ contrary Quality of binding and contracting every thing it is mixt with ‘ to itſelf, till by repeated Superinductions the Soil becomes fit for nei-

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‘ ther Tillage nor Paſture, it muſt be look'd upon by the Husbandman as ‘ Poiſon to his Clays. And there is this demonſtrative Reaſon to be gi- ‘ ven, that it is Poiſon *there*, or (which is the ſame Thing) leaves poi- ‘ ſonous Effects; becauſe Land thus ſpoilt by *Lime*, can neither be reco- ‘ vered, nor made to anſwer in Tillage, by continuing it even in the ‘ greateſt Plenty; which plainly ſhews, that there are ſuch ſtiff, cold, un- ‘ tractable Soils, which the Power of Lime can neither *mend* nor *cure*.

‘ After all, perhaps there is not a great deal of Difference between us. ‘ *You* own that Clays ſhould be open'd and mended, with Sand, Coal- ‘ Aſhes, Rags, *&c.* before they are laid down from *Lime*, to prevent and ‘ remedy its *contracting* Qualities and *binding* Effects: *I* ſay, the beſt ‘ way is to keep the *Diſeaſe* far off, that there may be no Occaſion for ‘ a *Cure*, which cannot be perfected but by a long and tedious Courſe of ‘ Phyſick, and to keep to ſuch wholſome Diet and proper Manures as ‘ want none.

‘ However, what I have learnt from your inſtructive Obſervations and ‘ philoſophical Reaſonings, is to me a Treaſure, which I ſhall always va- ‘ lue; and will at the ſame Time make me proud that I *have* differed from ‘ you, and yet have *differed* ſo little. I am

Your moſt affectionate Friend and Servant,

J. LAURENCE.

BECAUSE I am unwilling the Publick ſhould be deprived of any of my Friend's curious Reaſonings and Philoſophy, and becauſe he was willing to explain himſelf further on the Head of Lime, *&c.* what follows in another Letter may not be unacceptable to the inquiſitive Reader.

Dear Sir,

‘ I Am perſuaded, with you, that if a ſtiff Clay was lain down with ‘ Lime, it would bear nothing; and that the more Lime was after- ‘ wards added, the *harder* and *barrener* it would grow. *Light Soils* ‘ therefore ſhould be laid down with Lime; *ſtiff Ones* taken up with it.

‘ Lime *crumbles* the One and *binds* the Other, by the ſame Quality and ‘ Power of its Parts; that is, by the *attractive* Virtue of its *fixt* Salts, ‘ and the *active* Power of its *actual* Fire. Salts are hard Bodies endued ‘ with much Surface; which Surfaces coming into Contact with one a- ‘ nother, unite, (for Attraction is in Proportion to the Points in Con- ‘ tact,) or diſunite, as any other Body mingled with it can hinder the ‘ Contact, or join with them, by offering more Parts to contact. Wa- ‘ ter inſinuates itſelf into its Pores, and by that means attracts, and is ‘ attracted by Salts, and they are diſſolved, *i. e.* diſperſed and ſuſpended ‘ in every Part of the Water, and ſo kept aſunder out of the Sphere of ‘ their attractive Powers: But if the greateſt Part of the Water is eva- ‘ porated, then the Parts of Salt come nearer to each other, and within ‘ the Reach of their mutual Power, they ſhoot into *Cryſtals*, *i. e.* unite ‘ their Parts into Maſſes, till they become viſible. Analogous to this, ‘ Mortar is made by Lime; that is, all the Fire contained within the ‘ Stone, and not united to its fixt Salts, (which Union makes thoſe Salts ‘ ſo remarkably cauſtick) is ſuffered to go out, by the Salt's being diſſolved

‘ by the Water; but the Water which at firſt diſſolved the Salts in the
‘ Stone being evaporated by the Fire which was thus emitted, they run
‘ into Contact and unite; and unite alſo between themſelves the Sand,
‘ and other Material's mixt with it.

‘ But had thoſe Materials been in Quantity ſufficient to keep the Parts
‘ of thoſe Salts at a diſtance from each other beyond the reach of their
‘ attractive Virtue, which is of a very ſmall Extent, they could never
‘ form a Mortar, and then only would attract the Parts of Matter which
‘ ſurrounded them: By which, if theſe were before diſunited, they
‘ would be *clotted* and become firmer; but if before they were ſtrongly
‘ united between themſelves, they would be *crumbled*, the Attraction to
‘ the Parts of Lime overcoming the Attraction of the Parts between
‘ themſelves, juſt after the ſame manner as Salt is diſſolved in Water;
‘ but if the Water is evaporated, the Salts ſhoot again, i. e. *reunite*.
‘ So when Clay is *tendered*, if that which kept the Parts of the Lime at
‘ diſtance, is by Rain and Vegetation drained away, it anſwers to Evaporation
‘ in the other Caſe, and it binds unconquerably hard.

‘ I do not chuſe to uſe the Terms, *Poiſon*, &c. becauſe they convey
‘ Ideas of an *Effect*, and not of a *Cauſe*; which will be demanded from
‘ you. I do confeſs, that your Objection and Obſervations on what I
‘ have offered, appear to me a great Evidence that I explain this right;
‘ becauſe every Caſe you ſtate is ſolvable by thoſe *ſimple* and *uniform*
‘ Principles. And I believe no Fact can be offered, but may be made
‘ intelligible by this Method of Reaſoning: And if a Farmer well understands
‘ this, he can never be at a Loſs to know when to uſe *Lime*
‘ or to forbear, or what Manure is beſt for every kind of Land: Too
‘ looſe Soils muſt be *hardened*; too ſtiff muſt be *tendered*; *both* enriched.
‘ Lime and Clay, added to the ſandy Fields, will give them a
‘ Firmneſs; Lime at firſt breaking up uſed with Clay, and the continual
‘ Quantities of Sand, or Things analogous to it, as Coal-Aſhes, &c.
‘ added in a plentiful manner, will ſubdue the other; but *both* can only
‘ be enriched by Air, Rain, aſcending Steams from below, or the Parts
‘ of Vegetables, or Animals, (which have fed on them, or on what feeds
‘ on them) the Parts of theſe are broken into their original Particles by
‘ Fermentation, and ſo fitted to reaſcend into the ſmall Tubes of Plants
‘ and unite with them.

‘ This Aſcent is cauſed by the Heat of the Sun expanding the Air
‘ lodged with the Earth, and Moiſture, which carries up with it little
‘ Films of Water, which roll themſelves round a Particle of Air, and
‘ form by that means a minute Bubble. All Steams are minute Bubbles,
‘ as I could produce many Experiments to prove. With this Water is
‘ united Vegetable Matter, and is ſublimed with it in the Bubble.

‘ A ſecond Cauſe of this Aſcent is internal Heat, which alſo rarifies the
‘ Air mingled in Earth, and carries up in like manner Films of Vegetable
‘ Moiſture. A third Cauſe is that which makes Fluids aſcend between
‘ Glaſs Planes and form an Hyperbola, and in a Series of Glaſs Tubes.
‘ The Law of Aſcent is, it mounts higheſt in the ſmalleſt Pipes; but no
‘ Tubes are ſmaller than thoſe of Plants, therefore the Fluids would get
‘ up ſome way by this Principle alone; the other two aſſiſt and compleat
‘ it. From this Principle it muſt follow, that Plants which have
‘ the *largeſt* Veſſels will be the *loweſt*; which is confirm'd by Experi-

‘ ence; the *lofticſt* Trees conſiſting of firmeſt Timber, whilſt *creeping* ‘ Plants, are ſoft and ſucculent.

‘ When I began this Letter I reſolved to have filled it with ſome ‘ Thoughts about *Air*; but other Things came in the way, which I ‘ thought not improper to ſend to you, becauſe poſſibly not leſs neceſ‘ſary to clear up what I had ſaid before.

‘ That Hint I have added about *Air*, is a very ſmall part of what that ‘ Fluid performs in Vegetation; but I could not explain the Aſcent of ‘ the Juices, without anticipating ſo far what I have to ſay, and ſhall ſend to ‘ you. That Water is fitted to form itſelf into Bubbles, is evident from ‘ its *frothing* on Agitation, and its boiling up when in an Air-Pump. ‘ But this Experiment proves clearly, that there is a conſiderable *Tenacity* ‘ between its Parts; becauſe a fine Needle, placed horizontally on cold ‘ Water,. ſwims; which would not be, if the Tenacity did not overcome ‘ the different ſpecifick Gravity. No Art can make it ſwim on boiling ‘ Water, becauſe that violent Heat by its Motion deſtroys a great part ‘ of the Tenacity, and then Gravity acts uninterrupted; but that there is ‘ ſtill ſome Tenacity between Parts of boiling Water is evident, becauſe ‘ the Steams which aſcend, beheld in a darkened Chamber, into which ‘ a Sun-beam is admitted through a very ſmall *Foramen*; by this Beam ‘ appear nothing but minute Bladders of Water, containing highly rarified ‘ Air. I'll ſoon offer ſome Hints about *Water* to your Conſideration; ‘ which either uſe or deſtroy as you pleaſe. I am,

Dear S I R,

Your Affectionate, &c.

THAT I may not be thought tireſome on the Subject of *Lime*, whilſt I am treating about the Nature and Properties of *Water*; I ſhall only ſum up the whole, as follows. That *Lime* is an excellent Manure, rightly and diſcreetly apply'd, Dr. *Woodward*, my Friend, and my ſelf, are all agreed; but I am ſtill ſo unfortunate as *a little* to differ from the two former, as to its *operative* Effects, and the *Manner* of applying it. Thoſe two learned Gentlemen think *Lime* doth not *fatten*, but only *mellows* the Ground, affording no Matter fit for the Formation of Plants, but meerly *ſoftens* and *relaxes* the Earth; but becauſe I have found by long Experience, that from its heavy, ſaddening and binding Quality have been drawn forth the greateſt Riches on light and mixt Soils, I ſaw nothing contrary to Reaſon and true Philoſophy, but that the Duſt and moſt minute Parts of Lime (which is a calcined *Mineral* and full of Salts) might *themſelves*, by the help of Water, be carried up into the Veſſels of Plants for their Augment and Encreaſe

Poor light Land is certainly made *fatter* by Lime; and *rich* cold Clays do not need it, eſpecially at firſt breaking up, whilſt the *Sward* is left uncorrupted, and the Roots and Fibres of the Graſs keep it ſufficiently porous, and hollow to receive the fattening Dews of the Air; and yet if *Lime* is afterwards repeated here, it is by all agreed, and found ſo by long Experience, to do more harm than good.

Agreeable to this Philoſophy and Reaſoning it is, that the Farmer ſometimes lays his Lime upon light ſpongy Soils, (where Furze or Broom have grown, and much *worn out* the Ground) even at firſt breaking up;

but then it is not with a View to *open* and *relax* it, (for *that* it doth not want) but to *fatten* and *enrich* it, as well as to *ſadden* and *bind* it; and to give it ſuch a proper *Tenacity*, that moiſtening Dews and Rains may not ſink too ſoon away, nor be too ſoon exhauſted by the Heat of the Sun.

Reaſon and Philoſophy are great Helps to the clearing up the Truth: But abſtracted from Experience, under the Semblance of Truth, they often lead us into Errors and Miſtakes. And poſſible it is, that my own adhering to *ſeeming* Reaſons, and miſapplying Experience to them, may be the Cauſe that I am not yet convinced of the Juſtneſs of the Concluſions drawn by thoſe learned Gentlemen above.

Of INCLOSURES.

IN *Northampton* and *Staffordſhire*, and in ſeveral other Inland Counties, there is great Difference between the *Common Fields* and *Incloſures*: This *laſt* has ſeven, eight or ten Years Crops ſucceſſively, when the *other* has them but two Years in three. This employs, beſides the extraordinary Tillage, a great Labour, both of Man and Horſe, to manure it; and the Product is more than twenty Buſhels to the Acre; and at the End of its Ploughing, when it is laid to gain freſh Heart, it yields good Graſs, and no Time at all is loſt. And I am told by a Gentleman in *Lancaſhire*, that there they *Marle* their Incloſures, then Plough twelve Years together; then *Marle*, and Plough for twelve Years more; and ſo *ad infinitum*. For it muſt be granted to be a true Maxim, *That the Ground is never weary of doing Good*, if well fed, and well worked. So that I cannot but admire, the People of *England* ſhould be ſo backward to *Incloſe*; which would be worth more to us, than the Mines of the *Indies* to the King of *Spain*. *Incloſure* encreaſes the Rent of Land ſometimes Tenfold; and yet it is believed, that almoſt one Half Part of the Kingdom are *Commons:* But to be ſure, a Third of all the Kingdom is what we call Common-Fields; and if ſo, then the raiſing the Rent of *theſe* will vaſtly enrich the Kingdom, though we abate Eight of the Tenfold.

England has been allowed to contain *Nine and Twenty Millions* of Acres; but it is reaſonably ſuppoſed, that there are about *Forty Millions*. If ſo much; then about Thirteen Millions of Land will have its Price doubled, at leaſt: And ſuppoſe it now but a Crown the Acre, one with the other, it will improve yearly above Three Millions of Pounds *Sterling*; almoſt enough to pay our Taxes, and ſometimes more.

Some People have urged, that the Improving of ſome Ground would depreciate the Price of others; and ſo the *whole* be no ways benefited. But this has been rightly anſwered, that Improvement will encreaſe more in Quantity; the Conſequence of which will be, that either more will be exported in Kind, or it will *farther* Improvements, or feed more

People, or be thrown away; but who ever did ſo with their Hay, Corn or Cattle?

If ſome ſhould urge, that the Product will be Graſs, but no Corn for the Poor; the contrary is notorious in all incloſed Counties: for we ſee ploughed Land in Incloſures almoſt every where. But if Paſture ſhould be thereby increaſed, will not the Wool and Skins, produced by an Acre of Paſture, make greater Employment for the Poor, than the Tillage of ſuch an Acre can do? I think the Anſwer is plain, they will: And yet there will be an Overplus of Corn for the Poor too.

In ſhort, there can be no Argument uſed againſt Incloſures, but what, if it proves any thing, will prove too much, *viz.* That if the Land is made *better*, the Inhabitants will be made *worſe*; or that Riches will be made a Burden. The Abſurdity whereof is eaſily ſeen in *this* Light, tho' not perhaps in the *other*. Without all queſtion, Improvements, of what Kind ſoever, make *Riches* and *Plenty:* And *Plenty* calls together Inhabitants and People to conſume it: And even the Overplus is demanded in a Foreign Trade; which naturally tends to maintain the Grandeur and Magnificence of Some, and the Luxury and Intemperance of Others.

However, the *Abuſe* of Wealth is no Argument againſt an *honeſt Induſtry* in getting it. And it is certainly a Bleſſing to him that knows how to make a wiſe uſe of it, *i. e. To be a Father to the Fatherleſs, a Husband to the Widow*; *To be Eyes to the Blind, and Feet to the Lame.* To have a Power of *Improvement*, and not to *improve*, is to have a Talent laid by or hid in a Napkin; which is an Indolence and Slothfulneſs always accounted *Criminal.*

But becauſe what I have hitherto ſaid may be thought too general, to make any great Impreſſion upon thoſe who are not yet convinced that *Incloſures* are a general Advantage both to Poor and Rich; it may be obſerved, that the *Waſtes* and *Open Fields* draw to them the Poor and Neceſſitous, only for the Advantage of Pilfering and Stealing; who, when an *Incloſure* is once reſolved on, will be employ'd for many Years in planting and preſerving the Hedges; and afterwards will be ſet to work, both in the Tillage and Paſture, wherein they may get an honeſt Livelihood. And as to the Proprietors, their Advantage in *Incloſures* is undeniable; if there were nothing elſe in it, but that it lays a Foundation for *Induſtry*, and gives a Man Security in the quiet Poſſeſſing of his *Labour* and *Care*, which he is never ſure of in the *Waſtes* and *Open Fields*. But indeed, the Obſervation of only theſe two Things; the great Quantities of Ground that have been of late incloſed and are daily incloſing, and the Increaſe of Rent that is every where made by thoſe who do incloſe; ſufficiently demonſtrate the Benefit and Uſe of *Incloſures*.

This Improvement has been moſt neglected in the *North* of *England*; tho' it is now ſufficiently plain they begin to grow wiſer. And as to the Biſhoprick of *Durham*, which is by much the richeſt Part of the *North*, it is remarkable, that Nine Parts in Ten are already incloſed, and conſequently improved in their Value and Rents to a degree almoſt incredible. Accordingly, the more *Northern* Parts are following their Example. For tho' the *North* is come lateſt into this good Husbandry, yet if we conſider it well, it receives the greateſt Advantage thereby. A good tall Hedge-Row preſerves the Ground warm, and defends it from the violent and nipping Winds, that generally deſtroy and pinch much of the Corn, Pulſe, Graſs, or whatever grows in the open Fields or Champion Grounds; preſerving it alſo from thoſe drying and ſcorching Winds, ſo frequent in the Spring; and encouraging that Fertility and Richneſs, which the Land is either naturally ſubject to, or that is added by the diligent Care and Expence of the Farmer. Moreover, it is a means to furniſh the Huſbandman with a greater Burden of Corn and Pulſe; and when it is laid down to Graſs, yields much more than the open Field. The Hedges alſo being well planted with Trees, afford Shadow and Shelter for the Cattle, both in Summer and Winter; which elſe would deſtroy more with their Feet, than they would eat with their Mouths; preſenting at the ſame time the Husbandman Neceſſaries for the Maintenance of his Fire, his Plough, and his Cart.

Beſides: If the Trees in the Hedge-Rows be diſcreetly choſen and rightly planted, there may be a Supply of Maſt for Swine and Fruit for Cyder. So plain is it that Incloſure is the greateſt Encouragement to *good Husbandry*, and a Remedy for *Beggary*, the Poor being employed by the continual Labour that is beſtowed thereon; which is doubly repaid, as I have obſerved, by the fruitful Crop it annually yields.

Neither indeed are *Incloſures* ſubject to ſeveral grand Inconveniencies that attend the *Common Field*; which, being generally ſowed with Corn, are ſubject to be ſpoiled by Cattle, that ſtray out of the Commons and Highways adjacent to them. The Tenants alſo or Owners of the ſeveral Portions are ſtrictly bound, whatever other Buſineſs they have upon their Hands, to keep exact Time, as well in *ſowing* as in *reaping*, if they would ſecure the Fruits of their Labour to themſelves.

Moreover; The Differences of the Profits are plainly to be diſcerned by the *Severals* or incloſed Parcels of Land that have formerly been taken out of the Common-Field, even how much they excel the other in every Reſpect, tho' of the ſame Soil, and only an Hedge between, and what a yearly Value they bear above them.

It is further obſervable of moſt Sorts of Lands, that by how much the *ſmaller* the Incloſure is, the *greater* yearly Value it bears, and the *better* Burden of Corn and Graſs; and, on the contrary, the *larger* the Fields or Incloſures are, the *more* they reſemble the Common Fields or Plains, and conſequently are *moſt* ſubject to the like Inconveniencies: Inſomuch, that generally ſpeaking it is found that a Farm, divided into many *Severals* or *Incloſures*, yields a greater Rent than if the ſame were but in few: tho' at the ſame time it ſhould be obſerved with Caution, that *too many* tall Hedges, eſpecially if interſperſed with Trees in rich watered Meadows, do harm to the Soil and ſour the Graſs; which yet may be much prevented by taking off all *projecting* Branches.

Having thus far cleared the Way, by removing Objections againſt *Incloſures*, and ſhewing their general Benefit to every induſtrious Improver; the next Thing we have to do, is to lay down ſome general Directions for the performing that Undertaking in ſuch a manner, as may *beſt* and *ſooneſt* anſwer the End and the Deſign of it.

Every one knows, that as ſoon as an *Incloſure* is agreed upon, each one's Portion and Share muſt be divided and aſcertained to him, by throwing up Ditches in their proper Places and Boundaries. But as there have been great Errors and Miſtakes committed in this important Work, it will be neceſſary to be a little particular herein. He that plants either Hedges or Trees, plants for his *Life* and *Poſterity:* And an Error in the Beginning of ſuch a Work, is very undeſirable; becauſe tho' it may and will end in *Repentance*, yet the Miſtake here, ordinarily ſpeaking, cannot eaſily be rectified afterward: The beſt Way is to be wiſe in Time, and to take Advice beforehand.

A *provident* Perſon therefore, who foreſees (as commonly it may be foreſeen) that a large Demand will be made of ſuch proper Sets as may ſerve for a laſting Security againſt all *Treſpaſſes* and *Encroachments*, naturally thinks how to do this in the *cheapeſt*, as well as the beſt Manner. For which Purpoſe, a large Quantity of *Haws* ſhould be got together before Winter: And becauſe (whatever ignorant People may ſay) they will *ſleep*, not ſhoot, the firſt Year; it is the moſt adviſeable way, to prevent a Year's weeding, to bury them in a Hole in the Ground all in one Heap; and at *Michaelmas* or *Martlemas* following, ſow them in ſuch a convenient Place or Nurſery, where they may ſtand four or five Years carefully cleaned from Weeds. Here will be a conſtant Seminary for all Demands, and at all Times. Moreover, *Quick-Sets*, thus raiſed, are much to be preferred to thoſe which are gathered out of the Woods, and from the Bottom of Hedge-Rows, as having *ſtraiter clearer* Stems, and *better* Roots.

It is very deſirable, if poſſible, to have theſe *Quick-Sets* when they are as thick as one's little Finger; for beſides, that it is plain from Experience that they will ſhoot much ſtronger, and conſequently make a Fence much ſooner, than the ſmall ſort commonly made uſe of; ſo alſo a leſs Number will ſerve the Turn.

The induſtrious *Incloſer* then being furniſhed at hand, and with his own convenient Number of Quick-Sets; I adviſe by all Means, if poſſible, to begin his Plantation in *October*, and ſo continue it, when Froſts will permit, till the latter End of *February*; ſtill remembering, that thoſe which are planted in *Autumn* will much out-ſtrip thoſe planted in the *Spring*, eſpecially if a dry Summer ſucceed.

There are ſeveral Methods uſed in ſeveral Countries for making *Quick-ſet Hedges*; but after long Obſervation and Experience, the Manner and Method I moſt approve of, is as followeth: Mark a ſtrait Ditch out four Foot broad; and on that Side you intend to make your Bank, (which ſhould, if poſſible, be to the *North*,) lay the Turf with the Graſs-ſide downward *even* with the Edge of the Ditch; upon which lay ſome of your beſt Mould to *bed* the Quick in: Thus lay your Sets about eight Inches aſunder, with their Heads cut off, and lying in a Poſture betwixt horizontal and perpendicular *inclining*; only remembering the Convenience of future Shade, Maſt or Fruit, now is the Time to put in at about thirty Foot aſunder either a young *Oak* or *Aſh* or *Crab* to be grafted.

When the firſt Row of Quicks is thus diſcreetly laid at their due Diſtances, cover it over with good Mould about three Inches, and lay a Turf upon it, as before; and on *that* plant a ſecond Row of Sets in the Method as above, pointing to the intermediate Spaces of the lowermoſt Row, the Heads of the Sets extending themſelves only an Inch beyond the Turf on which they lie: Cover theſe alſo with the beſt Mould, as you did the former, and top the Bank with the Bottom of the Ditch. But remember not to load the Quick with too great a Weight of Earth, (not above ſix Inches;) and what is more throw on the Backſide, on which is to be ſet the dry or dead Hedge to defend the *Whole*. Both

Sides of the Ditch are to be made *ſloping*, till the Bottom is reduced to ſeven or eight Inches. Sometimes the Graſs on the Edge of the Turf is apt to grow and to annoy the *Quick*; therefore it may be convenient to take off an Inch of its outermoſt Edge, with a Knife or other ſharp Inſtrument, after it is laid. And having ſaid thus much about planting the *Quicks*, I think I need not ſay any thing about a Method of ſetting the Dead-Hedge, which every Country is ſo well acquainted with; every one knowing that it muſt or ſhould be ſuch as will effectually defend the tender Shoots of the Quick from Cattle.

The Method of planting Quick-ſet Hedges, as they do here in the *North*, in *ſingle* Rows, I can by no means approve of; and it appears to be *not right* for common Practice, for theſe following Reaſons.

1. Becauſe in caſe of a Failure in the Sets, (as ſome there will always be) eſpecially if two or three happen to fail together, there muſt of neceſſity be a *Gap*; which is very undeſirable in a Hedge that is to keep out Cattle of all Sorts. For altho' indeed a *Gap* may be greatly helped and mended afterwards, either by planting other Sets in the Place of the dead ones, or by *plaſhing* or *laying* horizontally the neighbouring Sets at three or four Years old; yet neither of theſe Ways are what any one would deſire to chuſe, as plainly loſing Time, and not always anſwering Expectation.

2. Becauſe ſingle Rows, at the beſt, are much more liable to become thin and bare at the Bottom in proceſs of time, and as they grow old: Inſomuch as then *Hogs* will eaſily be able to penetrate them, tho' at the ſame time the Hedges look fair and flouriſhing at the Top.

3. Becauſe they want the Advantages for their Preſervation, and to compleat their Goodneſs, which the preſent recommended Practice of the *South* Country of planting two Rows on a ſloping Bank have, *viz.* That after three or four Years Growth, by cutting down one Row after another, they preſerve each other without a new Fence; which by this means ſoon becomes an *impenetrable Hedge.*

It may perhaps be wondered, that I have mentioned and recommended only the *Haw* or *White-Thorn* as proper for Hedges and Fences. But as *That* is undoubtedly the beſt of all Others, almoſt in every Soil and Climate, Nature having furniſhed it with ſuch ſtrong *Armory* and many Inſtruments of Defence, I cannot ſee Reaſon to leave a known good One for Others of more uncertain Value, or leſs eſteemed; ſuch as Crabs or Elm, *&c.*

The *Holly* indeed offers it ſelf to our Choice with the beſt Reputation of moſt others, retaining its Leaves all the Winter, as a better Defence againſt the cold Winds; which being armed alſo with deſperate Prickles, is a great Security againſt foreign Invaders. But as this is not ordinarily to be had in any great Quantities out of the Nurſeries, (for Thoſe out of the Woods are worth little) and being known alſo to be of a ſlow Growth, except in ſome particular Soils and Places, it hath been generally neglected, perhaps too much, (for it reſiſts the coldeſt Winds and ſharpeſt Seaſons) for the common Uſe of *Incloſures*. The *Ilex* indeed in the *South* of *England* would be preferable to all other Plants, as growing quicker and higher than other Plants, and continuing green all Winter.

The *Black-Thorn*, which ſome *late Writers* have been ſo weak as to recommend, is plainly intolerable, and is to be avoided as a Nuiſance and Peſt to every Incloſure; like Superſtition in Religion, or moſt noxious Weeds in a Garden, eaſy to be brought in, but hard to be got out; ſhooting up from every Fibre of its Roots, and ſpreading itſelf like Wild-Fire over the beſt Land.

Furze indeed is a Thing that will grow in old worn-out Banks, where almoſt nothing elſe will, and may be raiſed either from Seeds or Sets, and will make a very ſecure Defence; but then being ſo ſubject to *poiſon* the whole Ground with its Seed carried abroad by the Wind, it hath been generally rejected as rather a *Nuiſance* than any *Advantage*, eſpecially in good Land. We are told of a *French Furze* that will grow to the Height of fifteen or ſixteen Foot, not ſubject to ſpread like the common ſort; but I could never yet hear ſo much of its good Qualities, as to tempt any to reject the known Virtues and Goodneſs of the *White-Thorn* to introduce that.

But, beſides the Method of *planting* of Quick-ſet Hedges; there is alſo ſomething to be ſaid about the Manner of *cutting* and *plaſhing* the ſame, when they come to be ten or twelve Years old; in the doing of which, there is required no little Art and Skill. For indeed, I can as little like and approve of the common Method of the *North* in the *cutting* their Hedges, as I do of their *planting* them. They only cut down their Hedges to about two Foot, and there leave them, oftentimes haggled and ſplit with the Stroke of the Hatchet downwards, like ſo many Pollards ſtanding cloſe together: Whereas the more *Southern* Practice in *Northampton*, *Bedford* and *Hertfordſhire*, is much rather to be commended and imitated; where they cut down their tall Hedges with Diſcretion, having always a Regard to the filling the *Bottom* of the Fence with young Wood. A good Dreſſer of a Hedge then ſhould always contrive to leave the upright Stems at different Lengths: Some are to be cut to the very Bottom, others to be left two Foot, and others three Foot high; ſtill remembering that the Stroke of the Bill move *upwards*, which will cauſe the Wound to be left *ſmooth*, the better to carry off the Wet.

But becauſe there will always be ſome Defects in the beſt Hedges; whereſoever a thin Place or Gap is found, there ſome of the moſt convenient neighbouring Branches are to be laid down *horizontally* at different Heights to fill them up: In the doing of which, Care and Caution is to be uſed in theſe following Particulars. *Firſt*, that the Top of each ſuch horizontal Branch be pruned and headed: *Secondly*, for the better laying it *horizontally*, that it be cut half-way, and *only* half-way through at the Place where it is bent: *Again*, that no Branch be bent beyond an *horizontal* Poſture, for then it will ſurely die: And *laſtly*, that for the better *fixing* ſuch Branches, a Stick with a Hook at the Top be thruſt into the Ground to keep it in its due Place, except ſome natural Stay happen to offer itſelf in the Hedge.

After this is done, there is a good deal of Art and Dexterity to be uſed in *watling* the Top of the Fence throughout, either with ſome long ſlender Branches of its own, or with ſuch Briars as can be conveniently got. An Hedge thus managed once in ten or twelve Years, becomes an *impregnable* and *almoſt everlaſting* Fence; and at the ſame Time, affords a large and plentiful Supply of Thorns and Stakes for other younger Hedges, that are not able to defend themſelves.

A good Husbandman, I ſhould think, need hardly be told, that it is neceſſary, as often as his Hedges are thus cut, if not oftener, to ſcour up the Ditches, and to lay what will conveniently lie at the Roots of the Quick, for its better Nouriſhment and Defence both from Weather and Cattle.

If an Eſtate is to be divided, and now firſt incloſed, Beauty requires that the Hedges ſhould be in ſtrait Lines, or according to ſome Plan and Deſign; where Variety united by Uniformity will make a Farm more agreeable than a Garden: And what will be thus more pleaſing to the Eye, will be cheapeſt and moſt convenient; ſtrait Lines are the ſhorteſt, and *Gothick* Buildings are vaſtly more expenſive than the majeſtick Simplicity of *Grecian* Architecture.

Of MEADOWS *and* PASTURE-GROUND.

AFTER an Eſtate is divided from the *Common Field*; and an *Incloſure*, together with the Method of doing it, is agreed upon: The next Thing to be conſidered is the *Proportion* that one Part ought to bear to another; and the natural Diſpoſition of every Part ſhould be ſettled and adjuſted in ſuch a Manner, that nothing may be wanting which might tend to enrich both the Farmer and the Farm.

For which Purpoſe it is generally agreed, that to make the *moſt* of an Eſtate, there ſhould be a due and regular *Proportion* preſerved relating to theſe three Things, *viz. Meadow and Paſture-Ground*; *Tillage*; *and Fallows*. Some think, that if *Tillage* and *Fallows* together be made equal to the *Meadow* and *Paſture-Ground*, it is ſufficient. But this Proportion depends altogether upon the Nature and Richneſs of the Soil. For if the Land be naturally good for Corn, and a Supply can be had of a ſufficient Quantity of Manure and Dung; then the greater Part ought to be reſerved for *Tillage*. And ſo on the other Side, if the Land be naturally good for Hay and Paſture, and there be a good Demand for Both; then Diſcretion teacheth, that *Meadow* and *Paſture* are to be indulged.

And altho' I am now ſpeaking of *Meadow* and *Paſture* under one Head, yet there is ſome Difference with regard to their Diſpoſition and Place. The *Paſture-Ground* where Cattle of all Sorts are conſtantly bred and kept, muſt of neceſſity be well ſupplied with Water, or elſe many Inconveniencies and Damages enſue. But what is intended for *Meadow* being made *Several* in the moſt dangerous Time, (*viz.* from *May-Day* to *Lammas*) may do much better without ſuch a conſtant Supply. Reaſon and Foreſight therefore muſt here direct and govern. But the moſt deſirable Contrivance (if it can be had) is to chuſe a Spring or Supply of Water, that may anſwer ſeveral Incloſures at once: And this is not uncommon.

It is hard to chuſe ſuch a proper Place for *Meadows* as will anſwer all Seaſons, and give Plenty both in Wet and Dry Summers. The *Up-land Meadows*, tho' they give the *leaſt*, yet it is commonly the *ſweeteſt* Hay. And the *Meadows* in Bottoms, tho' they give great Plenty, are ſometimes ſubject to Inundations, or at leaſt to ſuch great Wets as make the Hay *coarſe* and *rank*. So that *too much* or *too little* Water are almoſt equally prejudicial to *Meadows*. But if one had the Choice of Land proper for *Meadow* and *Paſture* too, it ſhould be ſuch as lieth low, or on a hanging Level, or on ſuch a rich Soil as hath a moiſt Bottom, eſpecially where ſome little Spring or Brook may be brought over it, and where there is ſome Deſcent in the Meadow to carry Water off on occaſion. Theſe are much better Circumſtances and Situations than thoſe by great Rivers, where the Crops are ſo frequently loſt or ſpoiled. The worſt Circumſtance of elevated *Meadows* is, that they often need Help and Mending; which the other ſeldom or never do, except when it can be eaſily done, and without Charge.

I ſhall have occaſion hereafter to ſpeak particularly of the Nature and Properties of all the ſeveral Sorts of Dungs and Manures proper for Improvement both of *Meadow* and *Paſture*. I ſhall only therefore here put the diligent Farmer in mind, that what Dung ſoever is laid either in Paſture or Meadow, ſhould be well harrowed in with Thorns drawn thro' the Back of the Harrow. And this is a Work may be done all the Winter till *Candlemas* or *Lady-Day*; when the Stones or other uſeleſs Trumpery ſhould be taken off, and the Bottoms of Hay-Stacks, and whatever Hay-Seed can be got together, laid on; which is much better beſtowed here than on the common Dunghill, which would produce Graſs and Weeds amongſt the Corn.

There is little need to ſay much of the other ſort of Grazing-Ground, or *Meadows*, lying near Rivers or Fens; becauſe their greateſt Improvement is overflowing, which brings the Soil of the Uplands upon them; ſo that they need no other mending, tho' conſtantly mowed: Which Overflowing, and the Method of doing it, is ſo *eaſy* and *natural*, and of late ſo *well underſtood* by conſtant Practice, that I ſhall not need to ſay any thing further on that Head, but refer the Reader to ſome general Directions under the Chapter of *Improvements*.

As to the ſtocking either Meadows or Paſture with proper and ſuitable Cattle, here lies the great Skill and Management of the Grazier, which yet is generally pretty well underſtood, *viz.* That the beſt Ground is to be ſtock'd with the beſt and largeſt Oxen, Cows, and Sheep; the middle Sort with a leſſer Size; and the more barren with Sheep alone, and thoſe chiefly Ewes for a breeding Stock; the rocky Part with Goats; and the worſt with Rabbets. For indeed, nothing is of greater Prejudice to the Farmer, than ſtocking his Land with Cattle that are larger than it will well bear.

Of Making HAY.

IN diſcourſing of *Meadows*, we are naturally led to ſay ſomething of *Hay*, and the ſeveral Methods of managing and making of it: For by a right and timely Care in this Particular, the provident Farmer ſecures a Winter's Suſtenance for his Cattle, when Nature has denied them the immediate Product of the Earth, lock'd up with Froſt or covered with Snow. Nay, and the ſame Wiſdom teaches him this further Providence, to lay up a good Store in a plentiful Year, to ſupply his unavoidable Want in a dry and ſcarce one. And then it need not be ſaid how much Diligence and Care ought to be uſed in the making and managing of that Food, which if it proves bad and damaged, doth but deceive both the Cattle and the Owner.

It ſhould be obſerved then, that tho' it is not ſo material for the *Paſture* to be laid level and free from Banks; becauſe the Graſs will grow for Bite well enough, and ſome think better, among ſmall Hillocks and little Unevenneſſes of the Ground: But yet it is otherwiſe with *Meadows*, which ſhould be very carefully levelled in the Spring, and the Dung made thereon beaten to pieces and ſcattered. And if a good Huſband can at all ſuffer them, all Mole-Heaps and Ant-Banks muſt be ſpread abroad and diſperſed; that the Stroke of the Scythe may not be interrupted in Harveſt, nor hindered from coming near the Ground. For conſtant Obſervation makes it undeniably true, that *one Inch at the Bottom is worth four at the Top.* And that the Force of this Rule may not be weakened, by imagining that what is left, is not *loſt* in an Incloſure; it is to be conſidered, that what is called the After-Marth is not properly what is left from the Scythe; but rather what preſently grows up after the Mower is gone: For what the Scythe leaves is in the main little elſe but the Stumps of full grown Graſs, worth little after it is died in the Sun three or four Days; and yet would have made a conſiderable Addition to the Bulk of Hay made and diſpoſed of in proper Seaſon.

The Time of *laying* Meadows for Hay is very different, according to the Nature and Situation of the Ground, and according to the different Rules and Practices of the Country in letting their Farms, and for the Convenience of their Cattle; but all agree, that the ſooner they are *laid* the better. Near *London*, where they have Dung enough, and where they have commonly two Crops in a Year, their common Practice is to lay their Meadows about *Candlemas*; and then they will be fit to Mow the firſt Time by the Middle or the latter End of *May*. But the more common Practice in the Inland and more *Northern* Parts is, not to lay them at ſooneſt till *Lady-Day*, and too often not till *May-Day*. By which means, if a dry Summer comes on, they are ſcorched up, and diſappointed of a Crop; which yet they are forced to wait for even till the latter End of the Year, and then likewiſe often find themſelves diſappointed: And, which is worſt of all, what they have is not near ſo good as Hay in its proper Seaſon.

If, by the Bleſſing of God, their Labours and Expectations are rewarded with a good Crop, there is yet great Care and Caution to be uſed in the *making* and gathering it together. In the doing of which, there is great Difference between the *Southern* and the *Northern* Practice. In the *North* they only turn it in the Sun two or three times, ſtill letting it lie in the Swarth and in Wind-Rows, without putting it in Cocks; till at laſt they think it is well nigh *made:* And then they put it in large Cocks, letting it ſtand in the Meadows a Week or Ten Days to ſweat: And after that they carry it home, or make a great Rick of it abroad.

Which Practice methinks cannot be altogether juſtified; inaſmuch as it ſubjects the Hay to be Mow-burnt, and to loſe its Colour. And howſoever theſe Things may be diſregarded, it is certain, Loſs of *Colour* is always attended with ſome Degree of Loſs of *Taſte*, and conſequently of that real Goodneſs and Proof which ſhould be given to Cattle that eat it.

The Practice therefore of the *South*, and their Induſtry and Care in making their Hay, ſo as to preſerve its Colour, is much rather to be commended and imitated. For when the Time of Mowing their Graſs is come, which they judge of by its looking brown, and beginning to bend its Head, they let it lie in the Swarth after Mowing, ſometimes two or three Days, but take the firſt fine Day to caſt it abroad, which is called *Tedding*; at Night they make it into little Graſs Cocks. The next Day (if fair) as ſoon as the Dew is off the Ground, they ſpread it again and turn it, that it may *wither* on the other Side; and ſo before the Dew falls in the Evening, it is Cocked up again. The next Day it is ſpread again, and drawn into long Wind-Rows; which is a convenient Method to dry the Hay, and makes it eaſy to get together again in Caſe of Rain, ſo as to be made into Cocks; in which they are very dexterous and expeditious. Before theſe large Cocks are carried, it is very proper juſt to ſpread them in the Sun, becauſe it is apt to *give* in the Cocks; and if any Rain happen to fall, do not turn it till the upper Part be dry; for to turn the wet Graſs to the moiſt Earth, is dangerous. Where thick-leaved Weeds are much amongſt the Graſs, more than ordinary Drying and Weather will be required: But when the Seaſon favours, call in all the Hands and Help you can, that it may appear the old Proverb juſtly takes Place, *Make Hay while the Sun ſhines.*

It needs hardly, I think, be ſaid, that Mowing of Land too often and too long, is a very great Prejudice to it; except it be ſuch Meadows as are conſtantly mended with Plenty of Dung, or with Water-Floods. Therefore where theſe Conveniencies are wanted, once in Three Years at leaſt, your Mowing-Ground ſhould be fed with Cattle: *Feeding* being as requiſite and neceſſary for Hay-Ground, as *Fallowing* is for Corn.

Having above treated of Meadow-Grounds, as reſerved for Graſs and Hay; it might be expected that I ſhould, in the next Place, treat of the ſeveral Sorts of artificial Graſs-Seeds, which have of late Years been uſed with ſo much Succeſs, that almoſt every one knows the vaſt Improvements in Husbandry made thereby. But becauſe their Uſe and Advantage depends greatly upon the right Knowledge of Ploughing and Sowing; and becauſe they are ſeldom made uſe of but for laying down the Land after two or three Crops of other Grain; I ſhall reſerve the particular Conſideration of them, to their proper Place, and proceed to treat concerning *Tillage* and *Arable-Land*; which will lead me to conſider the ſeveral Methods of Ploughing, and the proper Seeds to be ſown upon the ſeveral Soils moſt agreeable to every Kind of Seed.

Concerning ARABLE-LAND *and* TILLAGE.

TILLAGE is that Branch of Husbandry, which, if duly managed and well underſtood, brings undoubtedly the greateſt Profit to the Farmer: And if not underſtood or wrongly managed, will, of all other Employments, ſooneſt bring him to Beggary. It is a miſtake to think that the chief Gain and Advantage accruing to the Husbandman, is from the Labour of his Hand: For tho' a conſtant Aſſiduity and Care and Application of his Mind to his proper Buſineſs be abſolutely neceſſary; yet his Eye to watch, and his Underſtanding and Judgment to direct, are the chief Hinges upon which the Succeſs of his whole Buſineſs depends.

As to the Management of his *Arable Land,* which falls under our preſent Conſideration; tho' it is a Knowledge, for the attaining whereof there is required a good deal of Application, yet much alſo of the Myſtery lieth in a diſcreet ſuiting each Sort of *Soil* with right *Seed* and proper *Manure.*

Which Myſtery, tho' it has been of late Years pretty well explained, and better underſtood by Practice; and becauſe there are yet very many People in this Kingdom unaccountably wedded to their own Cuſtoms, and *will* look upon every new Improvement, that ſhall drive them from their antient Faith, to be a Sort of *Hereſy* in Agriculture; yet I would fain hope, if I can but offer ſome ſuch undeniable Reaſons, as are founded on Facts, to convince their Judgments, that they will not any longer retain their Prejudices, but lend their helping Hand to enrich both themſelves and their Native Country; that at length we may be the Envy of our Neighbours under every View.

In order then to attain a right and diſtinct Knowledge of the Art of *Tilling* Land, it will be neceſſary to ſay ſomething of the *Plough,* the chief Inſtrument in this Work, and one of the firſt Things the Farmer takes in Hand.

Of the PLOUGH, *and the ſeveral Sorts of them.*

THE Reaſons for Ploughing of Land are as follow: To kill the Weeds; to make the Ground looſe, that the Corn may fall into any Part of it; and alſo that it may with the Rains and Dews receive the Nitre from the Air, in order to its Fertility. For the Air and Sun drying the Earth, make it more porous, and conſequently more apt to ſuck in any freſh Moiſture, which the Sun carries away again; but leaves behind it the Nitre, as not being ſubject, when joined with Earth, to ariſe by Heat; unleſs it be extreme, as all Chymiſts know.

Now if the Ground be ſeldom ploughed, there can but a little Part be made fit to receive the Nitre: Whereas if it be oft turned, there is ſo much more made fit to anſwer the Purpoſe of Vegetation, by the continual Suction of Nitrous Dews to every Part.

But that I may proceed to ſomething Practical. It is very obſervable that the Make and Shape of the *Plough* is vaſtly different, according to the Fancy or Humour of the People, or it may be the real Exigence of the Soil and Situation of the Place. Some differ in the Length and Shape of their *Beams*; Some in the *Share*; Others in the *Coulter*, and in the *Handle:* every Place almoſt being wedded to their own Form; not always with a juſt regard to the real Goodneſs and Uſefulneſs of their own particular Sort. I will not therefore ſo much as attempt to deſcribe all the ſeveral Kinds in uſe; but ſhall content my ſelf with mentioning ſome of the principal Sorts. Among which theſe which follow are.

1. The double-wheeled Plough, which for its general Uſe and eaſy Draught, juſtly deſerves the Preference to all others, eſpecially where the Land is hard, flinty, or on ſharp Gravels. Nay, this Sort is ſingu-

larly uſeful on ſtrong Clays for the Summer Fallows, even after the Sun hath hardened them to ſuch a degree, that no other Plough will touch or penetrate. I remember at *Telvertoft*, ſome Years the Summer-Fallow was half loſt, and great Damage thereby attended the following Crop, till this Plough was introduced, to the great Benefit and Advantage to the Farmers. It doth not anſwer ſo well in wet Soils and Seaſons; becauſe Mire and Clay is apt to clog the Wheels. It is conſtantly and almoſt univerſally uſed in *Hertfordſhire*, and elſewhere. Being made ſtronger than moſt other *Ploughs*, they are uſually drawn with Horſes or Oxen two a-breaſt; the Wheels being eighteen or twenty Inches Diameter; and the Furrow-Wheel is thought by ſome to be beſt made a little larger in Circumference than the other, which goes on the ſolid Land.

Theſe are peculiarly uſeful for all Sorts of rough and uneven Work; they turn the Turf better than any of the common Sort, and plough up Mole-Hills or uneven Ground without levelling; and (as hath been obſerved) fallow Land in Summer in the drieſt Weather. The Fault found by Some, is their Handles; which ſtanding ſloping on one Side makes them very troubleſome to hold, till they become well acquainted with them. And then that Difficulty becomes familiar.

This Plough being now become frequent, it will be no difficult Matter to get its Form and Make by *Inſpection*, which is much better than the beſt Deſcription: But I was willing to give it its Merit and Preference by ſuch a Character, as may recommend it to the diligent Farmer for its general Uſe.

2. There is alſo a ſingle-wheeled Plough much uſed in ſome Places, as it ſuits almoſt all Sorts of Soils, and is much lighter and nimbler than the other. But ſtrong Land is too hard for it; otherwiſe if the Soil be light and clean, it may be drawn by one Horſe and held by one Man, and yet near an Acre may be turned up in one Day.

3. The plain Plough, which is made without either Wheel or Foot, is what much keeps its Credit for ſtrong and heavy Work, and will abide to be drawn with four or five Horſes at length. It hath generally a good *even* Gate, and therefore fitteſt for all ſtrong and clayey Lands, if they lie any thing level. But if the Land is extremely Irregular, or full of Stones, Roots or other ſtubborn Obſtructions, there the double-wheeled Plough muſt take Place.

Beſides theſe, there have been ſeveral Contrivances for Ploughs to make Expedition; which if they have not been found altogether to anſwer for general Uſe, yet Ingenuity ſhould always be encouraged; becauſe the old Rule takes place in this as well as in moſt other Caſes, *Facile eſt inventis addere.* There has been a Contrivance of a double Plough, that with the Help of four Horſes and two Men, a double Portion of Land may be ploughed, one Furrow by the Side of the other. Beſides which, there is another of the Sort, whereby two Furrows have been ploughed at once, one *under* another; ſo that the Land is ſtirred up twelve or fourteen Inches deep, which would be in many Places of exceeding great Uſe: And I mention them with a View, that Others may improve them; as there have been of late great Attempts; when, for inſtance, the Harrow has alſo been fixed to a Plough, that ploughing, ſowing and harrowing may all be performed at the ſame Time.

The general Rules to be obſerved in the Shape of Ploughs, are theſe. (1.) They muſt be great or ſmall, according to the Depth or Strength of the Soil you plough. (2.) The Coulter, where the Land is ſtiff, muſt be the greater and the ſtronger, and go the deeper; which muſt be proportioned to the Soil; becauſe in deep Grounds the Weeds root the deeper: For the better cutting of which, ſome place on the right Side of the Coulter a ſmall Wing, which cuts in two the Bottom of the Roots, and gives quicker Motion to the Plough. (3.) A great Art in making of Ploughs, is to make them go true to the Pitch they are ſet at, and keep to the Line you ſet them in, without ſwerving to the Right or Left; which depends much upon the Truth of the Iron-Work: And therefore it is rightly judged, that the Plough ſhould rather be ſuited to the Irons than the Irons to the Plough, the Wood-Work being eaſieſt altered if there be Occaſion.

Upon the whole; and upon all Occaſions great regard is to be had that the Plough be well proportioned for Strength to the Nature or Strength of the Ground that is to be ploughed; that the Irons be ſharpened and wear bright; and by how much any Plough is made ſhorter or leſſer, having its true Pitch, with its true Caſt on the Shield-board, by ſo much the eaſier it is both to Man and Horſe.

But after all, if the *Plough* is made according to Art, with Judgment and Diſcretion; yet if either of them are wanting in the *Plough-Man*, great Inconveniencies and Damages will enſue; which often happens from a too ſuperſtitious regard to the Cuſtoms and Faſhions of the Place, to the great Prejudice of good Husbandry. Indeed, his own Experience will beſt teach him how to lay his Furrows; of what Depth he ſhould plough them; and how he may be able to gain or raiſe the greateſt Store of Mould: So alſo he muſt judge with Diſcretion how to order his Cattle, and chuſe them for the diverſity of Ground to be tilled. But in caſe the Arable-Land ſhall lie againſt the Side of any ſteep Hill, (as for the moſt part all barren Earths do) if a Man ſhould plough that Land directly againſt the Hill, this very Labour would neceſſarily breed ſuch a Weariſomneſs in the Cattle, beſides the over-heating and ſurfeiting them, that the Work muſt of neceſſity ſtand ſtill. Wiſdom therefore will teach him to plough it *Side-ways*, overthwart the Hill, where the Beaſts may tread on the level Ground, and never directly up and down: By which means alſo the Compoſt laid thereon will not be ſo ſoon waſted away from the upper Part; for the Furrows not lying ſtrait down in an even Deſcent, but turned Croſs-ways upwards againſt the Hill, muſt of neceſſity the better hold the Soil and Manure within it.

Of the Uſe of TILLAGE *and* PLOUGHING *of* LAND.

TILLAGE is a moving or ſtirring of the Earth; which being performed on the Top of the Ground, enters to a certain Depth, and makes the lower and upper Part change Place. In reſpect to *Arable-Land*, tho' the *Spade* was antiently uſed as well as the *Plough*, yet the *latter* being found more expeditious and convenient, the *other* is grown out of uſe.

The Lands proper or made uſe of for Tillage, are reckoned of three Sorts. 1. Such as is clayey, ſtiff, cold and moiſt; which Sort of Land is uſually *thrice* ploughed, *viz.* In the Spring, Summer, and at Seed-time, for Wheat; and *four times* for Barley. Theſe Ploughings or *Fallowings*, as they are called, are very advantageous to the Ground; for hereby the Land by degrees is laid in ſuch Ridges, as the Nature thereof requires: For the more in Number and the higher the Ridges, the better, generally ſpeaking, they are for *Wheat*; which delights naturally in a moiſt Ground, provided it be not ſubject to be drowned or overmuch glutted with wet. It is a means likewiſe to make the Land lighter and fitter for the Seed to take Root in; the Clods being apt to diſſolve when expoſed to the Weather, and often broken by the Plough. As alſo it kills the Weeds, and puts the Land into a Capacity to receive the nitrous Dews and celeſtial Influences, which more eaſily coagulate and fix on a light Earth, than on a ſad and heavy Lump. Moreover, it defends the Corn from the Extremities of the Weather, eſpecially the cold Winds; for the more uneven any Land is, the better it bears ſuch Extremities.

2. Good rich mellow Land, that hath lain long in Paſture, till overgrown with Moſs, is improved by Ploughing; *that* being not only a Medicine to cure its Moſs and unhealthful State; but it raiſes an immediate Advantage, and improves the Land for the future, in caſe a Crop or two only be taken off at a time, and laid down for Paſture again well ſoiled or ſown with Graſſes; as ſhall be hereafter more particularly explained.

3. As for poor and barren Land, which hath lain long neglected and unimproved; here, without all queſtion, Tillage takes place with great Advantage: inaſmuch as it is the readieſt and ſureſt Means to keep down, if not kill, all ſour Graſs, Fern, Broom and Ruſhes; whereby an evil Juice hath been long contracted, ſo injurious to Vegetation and ſo hurtful to Cattle. But the Method of doing this to the greateſt Advantage, with reſpect both to the Land and the Farmer, will be occaſionally directed in its proper Place. Only I cannot forbear adding a Caution here; That great care ſhould be taken, that ſuch Land as this be not turned up above twice before it be laid down with Graſs-Seeds, except ſome extraordinary Quantity of Manure be laid on: inaſmuch as it is a Work of the greateſt Difficulty, Expence, and Length of Time, to reduce Land beggared and worn out with indiſcreet and avaritious Ploughing; or to bring it into any tolerable Order for Tillage after groſs Abuſe.

Of PLOUGHING *of* LAND.

THAT the Time and Method of Ploughing may be rightly underſtood, we muſt conſider diſtinctly what is commonly called *Layes* or *Greenſward*, and *Fallows*. The Ploughing up of *Layes*, or Graſs-Ground, is commonly performed ſoon after *Chriſtmas*, and, if poſſible, when the Land is throughly ſoaked with Wet; for then the Turf is tough, and will not break in turning. In the doing of which, great Diſcretion in the Plough-Man is to be uſed; that he turn the Turf in ſuch a manner, that the Graſs may not grow betwixt the Seams, and yet that he may go ſo deep as to get Mould enough to bury his Seed. For which purpoſe it is, that Ploughing ſo early is recommended, that the Froſt and Weather may looſen and mellow the Soil, that at Seed-Time the Harrow may take place amongſt the Roots of the Graſs, and cover the Seed with a ſufficient Quantity of Mould. Otherwiſe it is demonſtratively true in Experience, that Seed thrown into *freſh* Earth anſwers the Expectation of the Sower much better, than where the Land is firſt ploughed and ſome time after ſown. In this Caſe, however, it is ſeldom known that the Harrow will immediately take place after the ploughing up of Layes; and therefore it is generally neceſſary to wait a Month or ſix Weeks for a ſufficient Depth of Soil.

Where the Sward is old and full of large Ant-Hills, it is uſual in the firſt open Weather after *Chriſtmas* to make uſe of a large Hoe, whereby to cut and diſperſe moſt of the Banks, that the Plough may proceed regularly, and lay the Turf flat and true; otherwiſe much of the Seed will be buried with the Harrow, and yet ſome will lie ſo ſhallow as to be devoured by Birds.

In ploughing of Layes, ſome recommend the laying the Turf ſo perfectly flat, that you may not diſcern where the Plough went. But as this is hardly practicable, ſo neither is it very deſirable; inaſmuch as where the Turf *rides*, and is laid a little *ſloping* one upon another, the Seed falls regularly between the Seams; and that is always found to make the eveneſt and the beſt Crop.

As to the ploughing of *Fallows*, and the Time of doing it, great regard is to be had to the Nature of the Soil. But the Benefit of it is allowed by All to be very great, by its univerſal Practice, and by the Care that Landlords every where take to oblige their Tenants to a ſtrict Obſervance of it once at leaſt in Three Years. The Advantages of this Practice are chiefly theſe Three.

Firſt, It kills the Weeds, by turning up their Roots to the Air and Sun in the drieſt Seaſon; and if Wild-Oats, Darnel, or other noxious Weeds, happen to ſow themſelves afterwards; yet the Repetition ſoon again deſtroys them alſo, when they begin to peep out of the Ground; whereby the Heart and Strength of the Ground is preſerved from ſuch haſty Suckers.

Secondly, It is a Means to lay the Land in Ridges, thereby better expoſing it to receive the nitrous Influence of Froſt, Wind, Sun and Dews. Theſe all tend to ſweeten and mellow the Land very much; and the often ſtirring it breaks the otherwiſe untractable Clods of Clay, and ſo diſpoſes the Ground to receive the Seeds with all the Advantages of a proper Soil mix'd with Dung, and mellow'd with Weather.

Thirdly, The Fallows are a great Advantage and Relief to the Farmers Sheep, even till the middle or the latter End of *May*, and in ſome meaſure all the Summer, eſpecially in ſuch Corners and Places near the Hedges where the Plough cannot come. To anſwer which Purpoſe the better, in the open Fields in *Northamptonſhire* and *Leiceſterſhire*, and in moſt of the Inland Counties, they contrive to leave a Baulk two or three Yards wide betwixt every Land, for Graſs to ſupport their Sheep in the Fallow-Field; and the ſame when it is Corn-Field, affords a conſiderable Supply of Hay; by which Means the Farmer many Years pays his Rent out of the Encreaſe of his Flock and his Herd.

The right and the beſt Method of ordering Fallows, is next to be conſider'd. I think all are agreed, that after the Crop is off, it is beſt *not* to plough it, but to let it lie all the Winter, and to eat with Sheep or other Cattle what Graſs grows thereon till *April* or *May:* For moſt commonly the Farmer, as ſoon as he has done ſowing his *Corn*, begins to plough up his *Fallows*, as having little elſe then to do. But in the doing this, great Care and Caution ſhould be uſed that the Plough do not go too deep, where the good Soil itſelf is but ſhallow; as in many Clays, Stony-Grounds, and Sands: For it ſhould be conſider'd, that Wheat and Barley take but a ſhallow Hold of the Earth; and tho' they require a rich and mellow Soil, yet not any great Depth; and therefore, to begin a Fallow too deep, is only to bury the beſt Earth, to turn up a worſe to receive the Grain.

It is no inconſiderable Circumſtance, that the Farmer be alſo adviſed never, if poſſible, to fallow his Land in Rain or wet Weather; nor indeed, if it could be foreſeen, * when it is *likely* to rain; for in a wet and moiſt Seaſon, except the Roots of the Weeds (the ſtronger ſort eſpecially) be laid quite bare, they will grow and flouriſh ſoon after the Ploughing; and ſo a great Part of the Deſign of Turning the Soil will be loſt; and the Land, tho' it have the *Number*, will really want the *Benefit* of Fallows.

Beſides, there is a *Freſhneſs* in the Earth, when it is firſt turned up, that is a great Means of attracting the nitrous Virtue of the Air and Dew to itſelf; which, if rightly underſtood, is the greateſt Help to Vegetation, and a Means of that Fertility ſo earneſtly ſought for and expected from the fallowing of the Land. But in wet and ſhowery Weather that *Freſhneſs* is ſoon taken off, and the Pores of the Earth are filled up and glutted with ſuch watry Particles, as immediately ſend forth Weeds; and ſo the Land, inſtead of *receiving*, *gives* Nouriſhment, and conſequently waſtes its Strength.

This Reaſoning ought to be enforced on the Farmer in the ſtrongeſt Terms, becauſe I have long experienced that he is too regardleſs of this Matter: And becauſe he has nothing elſe to do, will be thruſting his Servants and Cattle into this *unſeaſonable* Work; it being certainly true in this Caſe, *That it is better to do nothing, than nothing to the Purpoſe.*

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* *The Method of judging of the Weather by the Barometer, ſee in the* Appendix.

The ſecond Ploughing of Fallows, is by ſome called *Stirring*; by others, *Twy-Fallowing*; and this is performed commonly in *June*, or about a Month after the other, as the Weather (which is always to be regarded) will favour. Now the Days are long, and Hay-Harveſt calling for Help, a good and provident Husband contrives to be out early in a Morning with his Team, to perform his *Quantum* of Twy-Fallowing early, by that Time the Dew is off the Graſs, that ſo he may have Leiſure to feed his Horſes, and to attend both the making and carrying his Hay.

About the latter End of *July*, or Beginning of *Auguſt*, is the Time of the laſt *Stirring* or *Twy-Fallowing*; which ſhould alſo be ſo contrived in the Morning, as not to interfere with or hinder either Hay or Corn-Harveſt: And as to the laying the Land *up* or *down* with the Plough, Diſcretion muſt be uſed, and Regard had to the Wetneſs or Dryneſs of the Land; always remembering, that Wheat being to be ſowed *Under-Furrow*, the Land at Seed-time muſt be ploughed *up*, and the Furrows laid ſo clean, that there may remain no Obſtructions to hinder the Winter-Wets from running off.

In ſome Places where the Land turns up with great Clots, they make Uſe of the Harrow to break them before they ſow their Wheat, and after that plough in the Seed, making many and ſmall Ridges; which is much the Practice of *Cambridge* and *Hertfordſhire*, eſpecially in the gravelly Soils, ſubject to Wet. But in Clay and deep Land, it is thought much better to break the biggeſt of the Clots with a Beetle, that they may get juſt Mould enough to cover the Seed; knowing well that every Froſt gradually diſſolves the Clots, and gives continual Nouriſhment and Relief to the Corn during the Winter; and even the Inequality of the Surface is found by Experience to be a ſpecial Shelter to the Corn from the Extremities of the cold *North* Winds, attended with Black Froſts; which are known to be the greateſt Enemies to all Winter-Corn.

Altho' I have mentioned Fallowing as performed once in three Years; yet in Land that is but indifferent, ſhallow and poor, Fallowing *every other Tear* is found to be the beſt Improvement, eſpecially where there is not Plenty of Dung to be had; which Piece of Husbandry is as ancient as *Virgil*, who is made to adviſe us in modern Poetry, thus:

In theſe unhappy Soils the Swains forbear,
And keep a Sabbath of alternate Tear;
That the ſpent Earth may gather Heat again,
And, bettered by Ceſſation, bear the Grain.

Lands thus ordered, are generally ſown with Rye; and being very ſhallow and light, *He* is reckoned to be the beſt Ploughman, that doth but juſt ſuperficially ſtir, or rather *ſcratch* his Land, provided he do it but oft enough, and give it a late Folding of the Sheep.

In ſome other Places they plough their Fallows but twice, truſting to the Strength and Richneſs of their Soil. But this Method is certainly wrong; for a well-ordered Fallow is attended with this certain Advantage, that it keeps the Land clean from Weeds; and therefore, if it do not want Fallowing to *enrich* it, it wants it to *mellow* and *cleanſe* it.

In all ſuch Fields or Land intended for Rye, the laſt Stirring or Fallowing ſhould be performed earlier than if it was for Wheat, that it may be laid up and prepared for an early ſowing the middle or the latter End of *Auguſt*; Rye being a Grain that is obſerved to be better for having two Summers during its Growth: For,

> *That Crop rewards the greedy Peaſant's Pains,*
> *Which twice the Sun, and once the Cold ſuſtains.*

As for Barley, which every one knows is not ſown till the Spring, *this* will require no leſs than four Stirrings during the Summer. The laſt of which ſhould always be ſo ordered as to lay up the Land conveniently high, and with as big Clots as may be, that it may lie the dryer all the Winter; for the preceding Froſts and Spring-Showers will quickly make it fine enough for ſowing, provided the Furrows be kept clear, and the lower Ends of the Lands open'd with Trenches to carry off the Water; which the induſtrious Husbandman always takes care of, whether it be for Wheat or Barley; rightly judging, that if it *be* ſown, the Seed is all loſt if it be ſuffered to lie under Water; and if it *be not* ſown, yet that Part of the Land is beggared which is covered with Winter-Wet. And yet it is not always ſo well conſidered as it ought, what a great and manifeſt Loſs this is to the Farmer; To be at the certain Pains and Charge to plough his Land four Times, to manure every Part of it, and then again to ſow it with the ſame Diligence, and yet at laſt to loſe the Fruits of all this Labour in ſuch Parts as are ſuffered to lie under Water. At the ſame Time, the Goodneſs of the reſt doth but reproach the Slothfulneſs of the Ploughman, who hath beſtowed the very ſame Pains and Charge on that which is loſt and good for nothing, when it might might have been prevented by a timely Care.

Before I conclude this Head, it may not be amiſs to adviſe, that if it ſo happen by Reaſon of a wet Summer, that after the laſt Fallow the Land laid up for Barley remain yet full of Weeds, it may be very proper to give it another Stirring during the Winter, either with the Plough or Harrow, in order to kill the Weeds; which Purpoſe would yet be more effectually accompliſhed, if the provident Ploughman could contrive this Work to be done before a Froſt, or as ſoon as a Froſt firſt and gently ſets in.

Of the ſeveral Methods of laying up LANDS *in Ridges, in order to the Sowing of them.*

THE great Myſtery of rightly diſpoſing Land to receive the Seed, and to preſerve it after it is ſown, is to *lay* it ſo, that it may be neither too wet nor too dry. Accordingly the ſeveral Cuſtoms of diſpoſing the Land for Grain, are conformable and chiefly adapted to the Nature of the Soil and the Situation of the Place. In all the Clay and deep Lands of *Leiceſterſhire, Northamptonſhire*, &c. they ſow all their Grain upon broad Lands, raiſing the Middle of the Ridges in ſome Places near three Foot higher than the Furrows: For indeed, the only Deſign of laying Land in Ridges, is the *draining* of it, and preſerving the Seed from a fatal Evil, *too much Moiſture*; and not, as ſome ignorantly imagine, in order to gain more Ground: For Grain, as well as Plants and

Trees, growing perpendicularly, it is plain to a Demonſtration that an uneven Surface doth not increaſe the Quantity; and as to Hills, though they meaſure near twice as much as the plain Ground they ſtand upon, yet the Produce of the One can be no more than the Produce of the Other. But this hath been made very plain by Thoſe who have treated of Surveying of Land.

Where either the natural Dryneſs of the Soil, or its convenient Declivity, doth not require the Land to be laid in Ridges, there the Ploughman only contrives to make ſuch Diviſions as may ſerve to guide him both in the Ploughing and Sowing, without regarding the Quarters of the Compaſs for the *running* of the Lands; which ſome have without any Reaſon recommended. Only here it may not be improper to obſerve, that where the Lands point directly *Eaſt* and *Weſt*, that Side of the Land which faces the *South* will ever be the *leaneſt*, and conſequently require the *moſt Manure*; inaſmuch as tho' the Heat of the Sun always tends to accelerate the Ripening of Grain and the Fruits of the Earth, yet its more immediate Influence and direct Rays are obſerved always to exhale or extract the moſt of the Virtue and Riches of the Superficies.

Where the Lands require to be laid in Ridges, and the Furrows to be kept well drained, (as for the moſt part is neceſſary) here I cannot but again recommend a ſeaſonable Care to carry away all ſtanding Water from the Ends of the Lands, by making ſuch proper Drains as may convey it to remote and lower Parts; becauſe, as I have already obſerved, in the well draining of Corn-Lands lieth a conſiderable part of good Husbandry, and no ſmall Advantage. Great regard therefore is to be had to that End and Side of the Land where the Plough *ſets in:* which as it will always of courſe and neceſſity lie *loweſt*; ſo alſo that End and Side of it, where the Plough goes out, will always be *higheſt*. To remedy this Inequality, the Spade is to be made uſe of, to throw it from the higher to the lower Part, and that before it comes to be ſown, at the laſt time of fallowing.

Moreover; if there be found a neceſſity of opening a Trench a-croſs the Head-land by way of Drain; let it be done conveniently wide and deep enough, ſo as effectually to anſwer the Purpoſe of a Drain; and obſerve, that what is taken out with the Spade be not laid too near the Side of the Drain, as is too common; ſo that Horſes, and other Cattle, poach it in again with their Feet: But let it rather be carried with the Cart, at ſome convenient Leiſure, to ſuch Places as want to be filled up, eſpecially the lower Ends of the Land aforementioned. And if it be ſuſpected, that the Graſs or Sward may do prejudice to the Corn ſowed on it, let it lie in one tall Heap in that hollow Place, and in a Year's time it will prove excellent Mould, fit to be diſperſed, and to receive the Seed the following Seaſon.

With ſuch Care, and with theſe Precautions relating to Tillage, the Land will be put into ſuch Order, that, with the Bleſſing of God, the vigilant Farmer may expect in due Time to ſee his Labours rewarded with a joyful and plentiful Harveſt.

Of the ſeveral Times and Methods of ſowing Corn.

As one Seed differeth in Nature from another, and as there are very different Soils to receive all the Variety of Seeds; there will of neceſſity be required good Judgment and Skill in the Husbandman to adapt *Kind*, and *Time*, and *Place*, to every remarkable Difference. And altho' this Matter hath been well ſtudied, and of late Years is much better underſtood than formerly; yet ſome general Hints, to remind if not inſtruct the Induſtrious, may perhaps be not unacceptable.

I think it is generally agreed, and found by Experience to be right, that *Changing* the Seed is a great Advantage and Improvement; eſpecially a Change from a *worſe* to a *better* Soil. But indeed *any way* is much better than *no Change* at all; inaſmuch as all Seed whatſoever, if long ſown in a Place, doth *degenerate*, and grow worſe both in Quantity and Quality. A Change of Seed from a barren light Land to a rich heavy one, is thought good. But moſt of the Clays in *Northamptonſhire* require their Seed-Wheat either from the Chalks in *Bedfordſhire*, or from other neighbouring gravelly Soils: having thereby two Advantages; of a Change of Seed, and of a greater Quantity in Number for a leſs; the Seed from ſuch Soils being much ſmaller, and conſequently ſpreads further. But in mooriſh Grounds, ſuch a Change is undeſirable, becauſe there the Seed is apt to be buried: and therefore they chuſe the largeſt Seed they can get. A Change from the remoteſt Part of the *North* is now well underſtood and known to be right; and ſo on the contrary, from the *South* into the *North*; which by means of Navigation is eaſily performed.

The *Time* of ſowing Wheat and Rye, is from the middle of *September* to the beginning of *December*, if Froſt permit; tho' Rye may be ſown a little ſooner on light Land. However, great regard ought to be had to the Weather, and the Nature of the Land you would ſow. Dry Land may be ſown in almoſt any Weather, either wet or dry. Whereas in moiſt Clays, if either Wheat in Autumn, or Barley in the Spring, be ſown in very wet Weather, there is great danger that it will *burſt*, or be buried with the binding Quality of the Earth; whereby the Seed is often ſhut up as in a Priſon: eſpecially it be ſown *Under-Furrow*, as is the almoſt univerſal Practice with reſpect to Wheat, and ſometimes Barley; and ſhould be alſo with reſpect to *Beans*, as ſhall be explained hereafter. Sometimes indeed the Weather may prove too dry for Wheat in a dry Soil, whereby great Part of the Seed will be muſtied and ſpoiled by lying too long in the Ground; and therefore it is better to ſtay till Rain come, or till there be ſome likelihood of it, the laſt Sowing often proving as good if not better than the firſt. But as for *Rye*, it is moſt deſirable it ſhould *always* be laid in the Duſt.

All Summer-Grain, *Oats*, *Barley* and *Peaſe*, ſhould be ſown when the Weather is dry, and as ſoon as the Land will *work*, let it be thought never ſo early; tho' ſome Exceptions of Land apt to run to Weeds ſhould be made. The Barley-Land having had four Fallows in the preceding Summer, and been ploughed *up* before Winter, let the Land be never ſo ſtrong, and of ſo ſtiff a Quality, it ought to be ploughed *down* before it is ſown; and becauſe the univerſal Rule requires that Seed (if poſſible) ſhould be thrown into *freſh* Mould, the Ploughing and Sowing ſhould both be performed in one Day.

It is, I think, generally agreed, tho' not ſo univerſally practiſed as it ought, that the ſteeping of Wheat in Brine before it is ſown will prevent the *Blaſt*, and *Smut*; which proceeds either from too much Fatneſs or Rankneſs of the Land ſoiled with rotten or muſty Vegetables, as Straw, Haulm, Fern, *&c.* or from the Seed it ſelf mixt with Smut, which tho' it doth not grow, yet it is found to ſpoil and poiſon the Seed wherewith it is mixt; or laſtly, it may proceed from a too frequent ſowing the Land with the ſame Grain. The effectual Cure for this Diſeaſe, is the right preparing the Brine, and ſteeping the Seed.

Some do this Work too *ſuperficially*; only throwing Urine upon the Seed, and mixing it therewith juſt before they go out to Sowing; or elſe make a good Mixture of Brine and Water, and only moiſtening the Seed with it on the Ground before they ſow, without giving it Time to infuſe or impregnate. By which means the End not being often obtained, they throw the whole aſide, and content themſelves to ſow the naked Seed.

Whereas, to do this effectually, Wheat ſhould be ſteeped in a Ciſtern and covered with a ſtrong Brine, at leaſt 12 Hours; ſome allow 24. After that, the Brine is to be drawn from it, and preſerved for further Uſe. But becauſe the Seed when thus wetted would ſtick together, therefore unſlacked Lime is preſently to be mixt with it; which makes it dry again, and apt enough to ſeparate in Sowing. This *Noſtrum* is ſaid to be diſcovered by the good Succeſs of Wheat ſown after the Accident of falling into the Sea-Water.

But neither is the mixing it with Lime to be accounted only an inſignificant Circumſtance with reſpect to Vegetation. For it is to be obſerved, that the manuring of Land with Lime, or otherwiſe enriching it with ſharp or ſaline Dungs, do of themſelves wonderfully contribute to keep Land wholeſome and free from this and ſuch like Diſeaſes.

But beſides this Method of ſteeping Wheat, to prevent the Diſeaſe of *Smut*; Mr. *Houghton* tells us of ſeveral Experiments he made about ſteeping Wheat and Barley in a certain Liquor, contrived to promote an extraordinary Increaſe. The Vehicle was thus contrived: "Take a con-
" venient Quantity of Rain-Water, and in every Gallon of it diſſolve
" two Pounds of Stone-Lime; let it ſtand two or three Days, ſtirring
" of it three times a Day. Pour off the Water into another Veſſel; and
" to every Gallon of this Water put about four Ounces of Salt-Petre,
" and one pound of Pidgeons Dung. Mix them well together, by ſtir-
" ring three or four times a Day; and then ſtrain out the Liquor to keep
" for Uſe. He tells us, he ſteeped a Handful of Wheat in a Quart of this Liquor; and after eighteen Hours, he took it out and laid it to dry in the Air for the ſpace of one Day, and then ſteeped it in the Liquor again about twelve Hours; and having laid it to dry as before, he ſteeped it again a third time about ſix Hours, and then ſet it in his Garden, which was but common Earth, by ſingle Grains, about ten Inches apart and a Finger's Length in depth. From hence he had an Increaſe beyond expectation; for from ſeveral Grains he had ſixty or ſeventy, and from ſome eighty Stalks, with very large Ears full of large Corn; many of the Ears had ſixty Grains in them, and none leſs than 40. He alſo ſteeped Barley in the ſame Liquor, and found much the ſame Increaſe.

Mr. *Houghton*'s Integrity in relating this ſhould not be diſputed; and there is no Improbability but ſo the Fact might be, as the Seed was ſowed in Garden-Mould, and in a ſheltered Place. And poſſibly had not the Seed been ſteeped in the Liquor, there had been a wonderful Increaſe from the Place and manner of ſowing. But I my ſelf have tried Barley ſteeped in a prepared Liquor much like this, and more promiſing: But being ſowed in an expoſed Place in a common Field, and on a Land not very rich, I found no extraordinary Increaſe; which made me deſiſt from any further Trials.

And indeed (as I have elſewhere obſerved) both Reaſon and Experience pronounce, that all extraordinary forcing Ingredients, all Chymical Preparations, all Extracts of Salts from Dung, Lime or other Manures, will not have any abiding Effects, ſo as to anſwer the Charge, much leſs the boaſted and wonderful Feats attributed to them. And if at any time, or under ſome certain Circumſtances, Nature is obſerved, by theſe forcing Methods, to mend her Pace; yet it is much under the like Diſadvantages of a Horſe *forced* beyond his natural Strength, he *tires* ſo much the ſooner.

Of the ſeveral Sorts of SOILS *good and bad, with ſome Directions interſperſed how to improve them.*

HAVING hitherto laid down ſome general Directions for Tillage and preparing Land by the Plough for ſowing; before I proceed to treat of the ſeveral Sorts of Grain, with the Time and Manner of ſowing them, it will be requiſite that I firſt ſay ſomething of the different *Soils* ordinarily to be met with in the ſeveral Parts of this Kingdom; that ſomething may be hinted at whereby to improve and make the beſt of them.

It is generally agreed, that all Sorts of Soils, whereſoever to be met with, muſt partake ſomething more or leſs of either *Sand*, *Gravel*, *Chalk*, *Loam*, *Marſh* or *Clay:* But yet it would be as hard to give a proper Name to the different Sorts of theſe, as to aſſign the peculiar Qualities proper to thoſe Names; becauſe there are good and bad of almoſt all Sorts; inaſmuch as the natural Richneſs of a Soil depends, in great meaſure, on a due Proportion and proper Mixture of ſome of the aforegoing *Simples.* For which Reaſon it is, that Sand is recommended to be laid on Clay, and Clay upon Sand; becauſe by ſuch Mixture a *laſting* Improvement is gained, and the very Nature of the Land itſelf is altered and changed.

However, where any one of theſe *Simples* prevail in a great Degree, tho' it would be hard or next to impoſſible to make an abſolute Cure by Superinductions; yet by a prudent Care and skilful Management, great Profit may accrue to the Farmer, by regular Obſervations of the Times and Seaſons proper for ploughing and ſowing each Kind of Land, and adapting the Seed proper to it.

Clays and *Chalks* are undoubtedly the beſt Soils for Wheat and Barley, after Summer-Fallows, and for Beans to ſucceed. And though the Clay is of itſelf never ſo ſtiff and untractable; yet the Summer-Fallows, with proper Manures of Dung, render it ſtrangely mellow, and a fit Recipient for Wheat; which being ſown before Winter, though the Surface be never ſo rough and full of Clots, will be ſo much the better defended from the *North* Winds. The Art in managing theſe very ſtiff Clays and Chalks, becauſe they are very tenacious and hold the Water on their Surface, is to lay them dry, in handſome Ridges, that the Water may fall off every way. The worſt Quality of them is, that in very dry Seaſons they are very coſtive, hardening and chapping with the Sun and Wind, thereby ſubjecting the Crop to the great Inconveniencies of a Drought.

Clays are commonly ſown, at firſt breaking up, with Oats; and if it is old Sward, it is thought the moſt profitable Way to continue ſowing Oats for Three Years: For on ſuch ſort of Soil, I have frequently known 10 Quarter of Oats upon an Acre; which will pay better than a good Crop of Wheat. After a Summer fallowing it may again be ſown with Wheat; and after that with Barley; and again with Beans. But the moſt profitable way to ſave Dung, is to ſow Clover with the laſt Crop of Oats, eating the Clover with Sheep for Two Years; and then Summer-fallow it twice for Wheat at *Michaelmas*. *Chalks* require much the ſame Management, and will bear the ſame Grain; only if much Rain happen to fall on them juſt after ſowing, before the Corn gets up, the Earth is apt to bind ſo hard, that the Corn cannot eaſily get through it; which Evil is much helped with a light Harrow.

Sand and *Gravel* Grounds eaſily admit both of Heat and Moiſture; which being the greateſt Helps to Vegetation, if they could but be perſuaded to remain in any due Proportion, great Riches might be expected from them. But as they are very apt to loſe the Bleſſings of Heaven, and to ſuffer the Crop to die away with ſcorching Heat, the Ploughman contrives to lay his Lands as flat as poſſible; and to let all his Superinductions be of the moſt cooling and binding Nature, ſuch as Cow-dung, rich Clay, Lime, Chalk, and Marle. The Seed proper for ſuch Soils is Rye, Oats, and Peaſe blue and white: For except it be mightily altered with the aforeſaid Mixtures, it is too light for Wheat and Barley.

At the firſt breaking up of *Sands* and *Gravels*, or other very light Land, *Oats* are commonly ſown after the Sward hath lain near Two Months to rot. As ſoon as the Oats begin to appear, the *Whole* ſhould be rolled with a good heavy Roll, either round or octangular, which faſtens the Ground about the Roots. For want of the Knowledge of this Practice, many Places in the *North* of *England* content themſelves to loſe the firſt Year's Crop, only turning up the Soil twice or thrice in the Summer; imagining that the Sward newly turned downwards will keep the Soil ſo hollow, that the Grain ſown thereon would periſh: which indeed might be true, without the Help of a Roll; but with that Help, we always reckoned and found in *Northamptonſhire* that the firſt and ſecond Crops were the *beſt*.

It is obſerved in *Herefordſhire*, they make a very great Improvement of ſandy Land much given to Moſs, by burning the Moſs, and mixing the Aſhes with Lime. After this they plough it and ſow it with Rye; which yields a mighty Increaſe, and (which is a very deſirable Circumſtance) brings a ſweet Sort of Graſs upon it, when laid down after a Crop or two.

In ſome Part of *Oxfordſhire* and *Buckinghamſhire*, they have a very untoward churliſh Sort of Soil, which puzzles the Farmer to make it fertile: They call it *Malm*; it is neither *Clay*, nor *Chalk*, nor *Marle*; but hath ſomething of the greazy Nature of them all, but no Part of their good Qualities; inſomuch that it is with great Difficulty that any thing will be made to grow on it. The Roots of Trees plainly avoid it, if poſſible; and it is found to be very hurtful to all Fruit-Trees. It ſeldom indeed lieth near the Surface, but it holds the Wet, and ſtrikes ſuch an unwholſome Coldneſs to Corn, Plants, and Trees, as mightily hinder their Vigour and Maturity. Notwithſtanding, I cannot find that it hath any thing nigh that Malignity in it, which is ſo plainly and conſtantly found in a *Stratum* of Earth, in the Biſhoprick of *Durham*, dug out in great Abundance in their Search after Coals. They call it *Thill*; it is of a bluiſh Colour, turns out like thin Slate, but crumbles to Pieces with the Froſt, as if it would be a fit Recipient for almoſt any Seed or Plant. But ſuch is its Hatred and Averſion to all Vegetables, that it kills and deſtroys them as ſoon as they approach it. It lieth indeed naturally at a conſiderable Depth in the Earth; but as there are great Numbers of Collieries, ſome Parts of the Country are greatly annoy'd with its vaſt Heaps; inſomuch, that it hath put ſome curious Gentlemen upon Trials and Experiments how to remove its obſtinate Sterility, and to make it fertile, even to avoid the Trouble and Charge of removing it into waſte Places. But all hath hitherto been in vain; for it not only refuſeth itſelf to be made good, but it poiſons and corrupts all Mixtures, and makes every thing that comes near it as bad as itſelf: For not a Spire of Graſs, nay, not a Weed will grow on it. It will not ſo much as mend the High-Ways; but yet it hath been made uſeful there, by filling up hollow Places, being good for nothing elſe.

In *Wiltſhire*, even the Plains of *Salisbury* of late Years have been made to anſwer the Plough to great Advantage. The Turf and Soil is generally very ſhallow, lying within two or three Inches, on a ſcaly ſtony Bottom. The Plains being of great Extent, ſometimes they plough one Part, and ſometimes another, for two or three Years, and then lay it down again with Graſs-Seed; whereby, and by the help of the Sheep, it recovers gradually its waſted Strength. Sometimes they *burn-bate* it, and afterwards take from it 4 or 5 Crops. But this laſt Method, tho' it brings preſent Riches, is obſerved to *tire* the Soil, and put it more out of Heart than can well be recovered again in any reaſonable Compaſs of Years; which is chiefly to be attributed to the Shallowneſs of the Soil. By theſe Methods they get pretty good Wheat, though the Straw is generally ſlender and the Ears ſhort.

Mooriſh heathy Land is obſerved to anſwer very well in the Method of *Denſhiring* or *Burn-bating*; becauſe the Soil generally, for five or ſix Inches deep, conſiſts chiefly of the Fibres and Roots of the ſeveral ſorts of Graſſes; and it is known, that all ſorts of Vegetables reduced to Aſhes, and ſpread upon the Ground, are enriching. It cannot but be obſerved here with Wonder, that there ſhould be ſo many heathy mooriſh Grounds near *London*, the Miſtreſs and Encourager of Arts, yet unimproved and uncultivated. What have *Hounſlow* and *Black-Heath* done, that they ſhould lye neglected as a Spectacle of the Husbandman's Diſdain? The *North* have already ſet a better Example, and in a little Time we ſhall not have ſuch a Reproach left amongſt us.

I need not ſay, that all hazelly red mixt Earth, approaching to the Nature of *Loam*, of which there is ſo much to be found throughout the Kingdom, is peculiarly good for all ſorts of Grain, and will endure the Extremes of Heat and Cold, Wet and Dry; and therefore is very much deſired, and eagerly ſought for by the Farmer, as what gives him Riches without any extraordinary Labour or Charge.

If a Man would be curious to know what Quantity of Sand, (for ſome I take it for granted always is) may lye mixt with his Clay, the Experiment may be eaſily made by diſſolving a Piece of Clay in Water, ſtill ſeparating and pouring off the thick into another Baſon till all is gone but the Sand; which when dry will be obſerved to run like Hour-Glaſs-Sand, and will ordinarily prove to be in Quantity about a *fourth part*.

Of DUNG, *its Nature and Uſe for the Improvement of Land, and the ſeveral Sorts of it.*

DUNG is to be eſteemed, in a great Meaſure, according to the Food eaten, and the manner of Chewing and Digeſtion: For it is in a healthful Body that part of the Food which is groſs, and not fine enough or fit enough to enter the Veſſels for the Nouriſhment of the Body; and alſo what the Blood caſts off by the Gaul, or other Paſſages; alſo it is likely that ſome of the more viſcous Parts of the Spittle holds it together, and goes quite through with it.

If this be the Caſe, it muſt have ſome Salt in it; and when Dung is burnt to Aſhes it will make a Lee, from whence by Evaporation may be made Salt; and this Salt will imbibe Nitre, as may be ſeen by divers Preparations of Nitre with Lime, &c. as *Alkalies*, and Salt or *Sal Gem*; which two laſt I take to be the ſame; and by their imbibing of Nitre it is thought that Land is fertilized. But its chief Uſe is for annual ſhort-lived Plants.

Dung will, when dry, burn; witneſs the Cow-Dung, gathered by the Poor for that purpoſe; and from it may be made Chymical Oil, which plainly proves it to have ſome Sulphur left.

Now a great deal of Difference from Dung may ariſe, by reaſon of the manner of Chewing. Thoſe Beaſts that chew fineſt, and void it in ſmalleſt Quantities, leave the moſt Superficies, whereby moſt Nitre may be attracted: And for this Cauſe I preſume it is, that the ingenious Mr. *Evelyn* ſo much commends the Duſt of Horſe-Paths, and powdered Dung or Earths. And I believe the generality of Dungs are eſteemed as thus qualified, except where the manner of Food makes an Alteration. For I doubt not but the Dung of Cows, by reaſon of their Chewing the Cud, is preferable to Horſe-Dung, eſpecially where the Horſes eat only Graſs, as do the Cows, and exerciſe no more; unleſs the Form alters it. But if Horſes eat Hay, or Oats, which is Food contracted and quitted of its watery Nature, it is then preferable. And Dung of Fowl, that live on Grain, is before that: And I do not doubt but Dung of Fowls, ſuch as are Fleſh-eaters, is better than thoſe; for which Reaſon the Dung of Men, Dogs, and Swine, that live on Fleſh, are eſteemed ſtronger than moſt other. And notwithſtanding Swine's Dung cauſes

Weeds, as is generally ſaid, it is probably from the ſame Reaſon, that the Corn in *America*, when the *Spaniards* firſt went there, grew to a Pike's Height; that is, it makes the Ground *too rich:* For if it is fertilized for Weeds, it will be ſo for other Things more uſeful; and if it be *too good*, it muſt be allayed with Earth, or ſome more barren Compoſt.

Mr. *Evelyn*, in his Notice of Dungs, has the following Obſervations. With the Microſcope he examined Neat's Dung, which appeared to be Straws held together by a ſlippery Mucilage, and ſprinkled with a Gold-like gliſtering Sand; but on waſhing nothing appeared but Straw. Sheep's Dung, when waſhed, he found to be ſhort Graſs. Swine's Dung was like dirty Bees Wax, mingled with Straws and Husks, which ſeemed like Candid Eringo, and ſome like Angelica Roots. Horſe-Dung, like Wiſps of Hay, and little Straws. Pidgeon's Dung was of a ſtiff glutinous Matter, eaſily reduced to Duſt of a grey Colour, with ſome husky Atoms after Dilution. Dung of Poultry was ſo full of Gravel and Sand, that little elſe appeared, ſave ſome black and white viſcous Matter twiſted; but it ſmelled the worſt of all.

Although the Uſe of Dung towards Vegetation is not perhaps thoroughly underſtood; yet that what does moſt apparently ſeem to vegetate Plants is *ſome Salt*, I ſuppoſe is generally agreed: All our Compoſts are ſtudiouſly made of Subſtances which moſt ingender or attract Salt. Therefore, it is the nitrous Grounds of *Jamaica* and other Places, which cauſe ſo ſtupendous a Growth of Plants and Trees.

After a great deal ſaid of Salt by Mr. *Evelyn*, he declares it to be, not our common Artificial Salt, but a more Unctuous Spirit or Airy Nitre, pregnant with a vital Balm, which is the Thing he endeavours to find in theſe Materials of Compoſts: And he believes, that were Nitre or Salt-Petre to be obtained in Plenty, we ſhould need but little other Compoſts, to meliorate our Ground; ſince whether that which ſo fertilizes it, by any Mixture we can yet deviſe, effects it from any other Cauſe, is greatly to be doubted. For which Reaſon, in ſeveral Sorts of Liquid Compoſts, he adviſes *Nitre* to be added, as an extraordinary and neceſſary Ingredient to vegetate Plants.

From what has been already obſerved, it will hardly be denied but that moſt of the Materials uſed for Improvement of Land, do rather do it by ſending earthy Particles into the Plants, by the help of Nitre; and the Spirit of the Air and Moiſture they receive from without, perhaps is more uſeful than any inherent Quality within themſelves.

The Nitre or Spirit of the Air, which flies about here and there as the Wind directs it, where-ever it finds a kind Matter fit to receive it, there it abides till the Dews and Rains waſh it in; ſo that it makes a Fermentation and ſets the Terreſtrial Matter afloat, in order to penetrate the Pores of Plants for their Growth and Increaſe.

Now thoſe Materials that are moſt ready to receive this Nitre, are what we call the *beſt Dungs*. Horſe-Dung, when it makes a Hot-Bed, does not do it ſo much by its own *Natural* as *Accidental* Qualities; for the Difference of the Parts, *viz. Dung*, *Urine*, and *Straw*, make a great Ferment, which warms the Juice in the Plant; which makes it ariſe as in an Alembick; and that being gone, it draws in the other Moiſture about it, and ſo goes on while the Warmth laſts, and makes the Plant grow greatly: And to force this the more, ſometimes is added Unſlaked Lime;

which, by pouring Water on, will ſlake and cauſe a great Heat, and ſo carry on the Growth of the Plants. This indeed ſeems as if Water with Heat was the Cauſe of Fertility, without Nitre.

But thoſe Gardeners that could by Fires, Stoves and Tanner's Bark, raiſe what Flowers and Fruits they pleaſed at *Chriſtmas*, and imitate the Heat of any Country or Seaſon, have confeſſed, that after all their Endeavours (except the Plants were opened at Top to enjoy the Weather) they would not thrive; which plainly proves, they muſt be kept from Suffocation, or helped to ſomething from the Air; and that Heat and Moiſture alone would not do. Horſe-Dung, by its violent Ferment, rots; and by ſo doing, evaporates a great deal of the Moiſture of the Urine, &c. that was in its empty Spaces; then the Air with its nitrous Particles gets in, which is waſhed out again by the Dews or Rain, and with them is carried to its Growth or Augmentation.

The Sun ſomething hurts Dung, but the Rain doth more; for it fills it, ſo that it is not capable to receive ſo much Nitre as otherwiſe; altho' ſome Wet and ſome Dry rots and prepares it the better: And this is the Good it does when ploughed into Ground.

There are variety of Ways of Dunging of Land, beſides the Dung of Pidgeons, Hens, Swine, &c. Rags, Soot, &c. The Suds made with Soap and Blood are of excellent uſe for the Husbandman and Gardener; and are often applied to the Roots of Vines, Fruit-Trees, and ſeveral other Vegetables. Soap-Suds will make Plants thrive very much; and the Reaſon for it is, that ſome of the fine Salt of the Pot-Aſh, with which the Soap is made, may be imbibed into the Plant; and with the Particles of Lime that may be there, are great Recipients of the aerial Nitre.

It is for the ſame Reaſon that the Aſhes and the burning of Stubble, or other Vegetables, does fructify Land: And I prefer the Aſhes of Vegetables before Soot; for the Aſhes we certainly know will emit Salt, and the Earth of them will imbibe a new Matter, as Earth from whence Salt Petre is extracted will be impregnated with Salt Petre again in a few Years; but Soot, though the Water when heated upon it by the Sun may poſſibly draw from thence ſome Oil, (as we ſee hot Water does from Coffee ſo prepared) yet I cannot learn that fixed Salt can be extracted from Soot, till there be a higher Calcination; nor then, but in ſmall Quantity; for the fixed Salt draws Nitre moſt: And the Spirit of Soot is drawn from a Retort filled with it, and placed in an open Fire; by which means the Soot is farther calcined, and muſt leave its Salt behind till extracted by a watery *Menſtruum*, when the Salt will draw the Nitre of the Air.

I do not by this mean that Soot has no Virtue; for by its burning it muſt be more porous than Wood, and ſo imbibe more; but when the Oil, by the Heat of the Sun or actual Fire, is extracted, it is more porous ſtill, and will attract ſtronger than before: And, as I have already hinted, I believe that theſe Aſhes, or its Parts, of Salt and *Caput Mortuum*, Lime or Earth made dry by the Sun, do draw into their Pores the Nitre of the Air, which is again waſhed from thence by the Dews and Rain; all which help to convey Terreſtrial Matter to the Roots of the Plants, where they with other Moiſture, are ſucked in; and from thence riſe to the Top, by reaſon of the Sun's making, as it were a *Vacuum*, after the manner as Water riſes in a Pump, and the fineſt

Parts by the preſſure of the Air are driven through the Pipes, till all evaporates to a dead ſtanding Plant; and then by new Fermentations it rots, and the thinneſt is driven again till the whole is brought to its firſt Principles; whereby, after the ſame manner, it helps to make the other Plants.

By Conſideration of what has been obſerved, it is eaſy to apprehend the Reaſon why Soap-Aſhes are ſo much coveted by the Husbandman, and eſteemed one of the beſt bulky Manures that are known: They are greedy for it, and mix it with Chalk, Lime, other Earth, or all, that a great Part of their Land may have ſome.

I have mentioned Nitre often, in my Obſervations on Dungs, believing it to be the Foundation of Husbandry, which I would gladly bring to an Art: But Experience is ſtill the beſt Guide.

Dungs are uſed very often in Medicine, and commended for the eaſing of moſt Sorts of Pains. Dung of Stone-Horſes is preſſed, and the Juice drank for Cholicks; that of Dogs is taken for Quinſies or Sore Throats; for Dogs eating Fleſh, their Dung abounds with volatile Salt: Man's Dung we have an Antipathy to; but by reaſon of his continual Fleſh-eating, it is the ſtrongeſt of all, but not the beſt for Uſe, by reaſon it breeds Worms, and therefore is hurtful to Trees and Plants. In Retorts, Volatile Spirits may be drawn from Dung as well as Urine.

If Heat and Moiſture alone, and a freedom for Plants to breathe in, were ſufficient, Dungs and Lime for Ground would not be needful. But Dung till Calcination, or perfect Rottenneſs, will afford little or no Salt; and Lime no Salt at all. And therefore if they do not imbibe the Nitre or Spirit of the Air, I do not ſee how or which way they can be uſeful, in the Improvement of Land.

Having thus far treated of the Nature of Dungs, and their probable Operation and Influence on Vegetation; it will be neceſſary to be a little more particular in treating of the different Sorts, their Uſe, and the ſeveral Methods of applying them for the Improvement of Land.

I think it may be laid down as a juſt Poſition and Maxim, that *Whatſoever hath active Parts in it, if it be not juſt of the Nature of the Ground, will raiſe Improvement:* Heterogeneous Things, upon their Meeting, cauſing that Buſtle and Stir, which is thought by moſt Naturaliſts now to have great Influence upon Vegetation. The general Art therefore of Improvement, is to adjuſt all Superinductions to the Nature of the Soil. Hot and dry Things are to be apply'd to cold and moiſt Land. And, on the contrary, cold and moiſt Things are to be apply'd to hot and dry Land. To ſay, therefore, that This or That Dung and Compoſt is beſt for all Improvements, is like a Catholicon in Phyſick, good for all Conſtitutions; which among Phyſicians is accounted an Abſurdity. Reaſon and Philoſophy, join'd with Experience, muſt then be a Guide to Practice.

There are two general (tho' not the only) Misfortunes which are the Cauſes of great Barrenneſs in Land, in the two Extremes; *viz.* Too great Moiſture, and too great Dryneſs. For, as too much Moiſture is an undoubted Cauſe of Sterility, ſo too much Dryneſs is the Occaſion of Poverty in Land; the Conſequence of moſt ſandy and gravelly Soils, as the other is of too ſtrong and ſtiff a Clay: Tho' it may not be amiſs to obſerve by the way, that cold wet Grounds are much more eaſily fertilized by draining, than hot Soils can ordinarily admit of by drowning and watring. Let us then try what proper Remedies may be apply'd to theſe two Extremes, before we proceed to treat of other general Improvements proper for Land.

1. To prevent Sterility occaſioned by too great Moiſture, either by Reaſon of a ſtiff untractable Clay, or by Stagnation of Water, it will be as eaſily imagined as allowed of, that *Draining* muſt be the original and moſt effectual Cure. For tho' Water and Moiſture are abſolutely neceſſary for Vegetation, yet it is manifeſt in Experience, that *too much* is as bad as *too little*; inaſmuch as Boggineſs and Obſtructions of Springs, more or leſs, are generally the Cauſe of that cold Chillneſs that affects ſome Lands, breeding Ruſh, Flags, and other uſeleſs Trumpery; and therefore, the Foundation of the Cure, and Improvement expected, muſt be to remove this internal Cauſe, by laying the Ground dry, and draining the Bog.

All I think agree, that Trenches and Outlets are the only Cure, and abſolutely neceſſary for this Purpoſe; tho' there have been great Diverſity of Opinions in the Methods of working and forming theſe Trenches. After all that I have ſeen and experienced, relating to the forming Trenches and Outlets; the following Method I have found to anſwer the End beſt, and ſeems to be the eaſieſt and moſt natural. If the Bog hath any Declivity, begin at the loweſt Part to open a Trench three Foot wide, and work upwards till you come to the Foundation of the Diſeaſe, the Spring-Head; where alſo you muſt make ſuch Trenches, either round or croſs the Bog, as you ſhall find neceſſary to drain it thoroughly: But be ſure go deep enough, and repeat the Trenches as occaſion ſerves. The more Trenches, the more ſecure you are of a Drain. Let the Trench be cut at leaſt a Spit below the Spring, or elſe all your Labour will be in vain. Some content themſelves to leave the Trenches open, and repair them as Neceſſity requires. But in that Caſe, I adviſe that the Earth taken out may not remain on the Sides of the Trenches, but be carried farther off, ſo as to fill up any hollow Places. However, I cannot but think it adviſable (the Charge and Labour not being great) to throw in a convenient Layer of *Green* Wood, Elm, Sallow, or Willow Branches, and upon that to lay the outward Turf, the Sward downwards, and ſo fill it up to a Level with what remains.

This, you'll ſay, ſeems natural and eaſy enough. But the great Difficulty of all is to drain a flat Bog or over-wet Ground, lying moſt part of the Winter under Water for want of a Deſcent or Declivity to carry off the Water. I have never yet ſeen any Remedy preſcribed for this Caſe, but what has been more Charge than Profit. But if we cannot gain all we *would*, we muſt gain all we *can*: Therefore the wiſeſt way is, to be willing to loſe Some to get Some. Mark out then a ſquare Piece (in the dryeſt Seaſon) in the middle of this Flat, bigger or leſs according to the Quantity of the Ground, and dig it ſix or ſeven or eight Foot deep, diſperſing it all over the Flat, whereby the whole may be raiſed ſo as to keep its Head above Water. For ſo many Inches as you riſe in Height, juſt ſo many Inches do you get towards a Drain. And to ſome perhaps it will be thought no ſmall Acquiſition, that by this means they have gained a Fiſh-Pond.

2. Let us now then proceed to ſay ſomething of the other Extreme, *viz.* Sterility, occaſioned by too much Dryneſs, the Effect of moſt ſandy and gravelly Soils; in regard that they retain not the Rain-Water ſo well as Clay, or Land of a mixt and loamy Nature. One, and indeed the moſt proper, Remedy for this Defect, where it can be had, is artificial Watering; which tempers the Ground, and ſets the Salts in motion for the ſpeedy Improvement and Growth of moſt uſeful Plants, Grain and Graſs. For as Water (being always more or leſs mixt with Terreſtrial Matter) is properly a Soil, and hath an exceeding Agreeableneſs to the Bodies of moſt Vegetables; as appears by Experiments of their Growth in Water only: So there is likewiſe a very conſiderable Advantage gained to dry, ſandy and gravelly Earth, by the fat and unctuous Waſh that is carried along in Land-Floods, and Currents of Water, that having paſſed through Cities, Roads, and ſoiled Places, do ſtrangely impregnate where-ever they are diſperſed: inaſmuch as the Salts, and other mixt Soil carried away by the Flood, naturally and gradually ſubſiding, are left behind upon the Land; which mixing themſelves with the Sand, Gravel, and other heterogeneous Bodies unlike themſelves, do, by the Help of the Sun, cauſe that Motion and Circulation of the minute Parts of Terreſtrial Matter, which by Naturaliſts is now generally thought to be the Life of Vegetation, and the true Cauſe of the Increaſe of Plants.

Where therefore the Situation is ſo happy as to admit this great Advantage of drawing the Water over the Land, and turning it off at Pleaſure, the Uſe of it ſhould by no means be neglected at the proper Seaſon. And there is no great Difficulty in the doing it; when once a Diſcovery is made where the Water may be conveyed, ſo as to anſwer the general Purpoſe. Cut out the Maſter-Trench, or Water-Courſe, to ſuch a Bigneſs as may contain all the Land-Flood; when the Water is brought thither, carry it in foot-broad Trenches all along the Level; and if there be diſcovered in theſe leſſer Trenches any Miſtake or Failing, it may eaſily be mended, by going higher to or lower from the Level, whilſt for a time the firſt Trench be ſtopped up again. This done, the Water-Courſe muſt be cut out large enough to contain the whole Water intended for the Improvement of the Land. And this Largeneſs ought to conſiſt in Breadth, and not in Depth; for a ſhallow Trench about a Foot deep is beſt for this Work. Only obſerve, when the Trench is brought near to an End, it is to be brought narrower and narrower.

The Time for the Operation of this Improvement, muſt be when the Graſs is not much grown; that is, in Winter, or early in the Spring. Only you muſt obſerve, to let the Water dry in before you repeat the drowning, and not to let Cattle poach it; for too much conſtant Wet rots and poiſons the Roots of the Graſs, eſpecially in ſuch Places where it ſtagnates. By this very Improvement, we have Inſtances of Land raiſed in Value from Eighteen-pence to Thirty Shillings an Acre.

But yet at the ſame time it ſhould be alſo noted, that there are ſome Springs, whoſe Waters are rather injurious to Land, and hinder Vegetation; ſuch, for inſtance, as flow from Coal-Mines, or any Chalybiate or ſulphureous Mineral, having harſh and brackiſh Qualities hurtful to Vegetables. However, I cannot but think that even theſe Waters would make great Improvements, if diſcreetly and ſparingly uſed, and at ſuch proper Times too, when other Quantities of Water might be contrived to mix with them.

But this Improvement by Floating is a Felicity not every where, and indeed in but a few Places, to be obtained. Therefore it will be neceſſary to point out what Helps may be had for hot and dry Land, where the other is wanting. Let it then be remembered, that the moſt cooling, moiſt, and proper Manures for hot and dry Ground, are Cow-Dung, Marle, Clay, Chalk, but eſpecially Mud taken from the bottom of Ponds; the Excellency of which is not ſufficiently underſtood, and therefore not uſed ſo much as it ought: For whether the Improvement of warm Land kept in Tillage is intended, there can be nothing better to lay on the Fallows than Mud out of the bottom of old Ponds ſpread abroad at *Midſummer*; or if it is to improve warm Paſtures and Meadows, nothing will better or ſooner anſwer the End, if uſed in the *Autumn*, or *Spring* after 'tis mellowed by the Froſt. For it not only fertilizes ſuch ſort of Land, but prevents, in a great meaſure, the diſmal Effects of a ſucceeding Drought. The Nature and Excellence of the other ſeveral Dungs, Manures, and Improvements, I ſhall ſpeak of diſtinctly by themſelves, that they may be uſed with Knowledge and Diſcretion.

Of the ſeveral Sorts of DUNGS *ſtrictly and properly ſo called.*

HORSE-DUNG, when taken freſh from the Stable, is of no other Uſe, but to give a breathing ſweating Heat to all tender Plants ſown in a convenient Depth of Earth laid upon its Surface. But its Uſe and Advantage in the way of Hot-Beds, I ſhall ſpeak of in a Place by it ſelf. Therefore when I ſpeak of *Horſe-Dung* here, it is meant ſuch as is laid in Heaps to rot for Manure and Improvement: And this is by all agreed to be one of the beſt Dungs for general Uſe, but eſpecially for ſuch Lands as are not over-hot of themſelves; and in that Caſe it ſhould be uſed diſcreetly, and mixt with other cooling Dungs, ſuch as Cows and Hogs Dung, or elſe Chalk and Mud. The more it is rotted, the better it is for Uſe, and the eaſier carried abroad. I cannot therefore approve of a common ſlovenly Way of uſing it in many Places, where they ſuffer it to be made as a Bed in the Farm-Yard for Cattle to lye on. Whereas the oftener it is ſtirred, and the hollower it lieth, the better for rotting. For which purpoſe, about *Chriſtmas* it ſhould be built up in ſquare or round Heaps, and the Walls of it made perpendicular, to keep Hogs and other Cattle off from treading it; and ſo the Reſidue, as it continues to be made either from the Stable, or the Cows or Hogs, is to be thrown upon that Heap, which will continue to give it a daily Fermentation. And this Heap of Dung ſhould, if poſſible, be made in ſome Pit or hollow Place in the Yard, that the Rain-Water paſſing through it, as well as the Urine from the Horſes and Cows, (which by ſome are thought to be the richeſt Manure) may be preſerved and kept from running off. By this means the whole Dunghill will be ſo rotted by the following *May* or *June*, the Time for carrying it abroad, that it will cut with the Spade like Mud, and carry with it an abundant Fertility. Many content themſelves to ſpread it in the Summer as they carry it out: But others, who will be at ſome Pains for better Improvements, lay it on ſeveral little Heaps on the Fallow Land, and ſpread it afterwards before the laſt Ploughing. Twenty Load of this Dung is abundantly enough for an Acre; and it is ſingularly good for Wheat and Barley. If more is laid on, it makes the Land run to Weeds, and the Corn to Straw; therefore this middle Proportion is beſt, becauſe it is ſuppoſed to be renewed once in Three Years; except the Land be well folded with Sheep alternately, which indeed is the moſt adviſable Method.

There needs little to be ſaid of the Uſe of *Cow-Dung*, having already adviſed the mixing it as above, and deſcribed its Nature. *Hogs-Dung* heretofore was not much valued; but now it is known to be a ſtrong and moſt excellent Manure for almoſt all Sorts of Land, eſpecially the hot and dry. By throwing the Refuſe of Garden-ſtuff into the Hogs-Cott, ſeveral Loads of the beſt Dung may every Year be made; which, beſide the Advantage of feeding the Hogs, brings no ſmall Profit to the Farmer. But in ſome Parts, on poor light ſhallow Land they ſow a ſmall white Pea, which they never gather; but turn in as many Hogs to eat them as they think will be fat; and there they let them lye Night and Day, whereby their Land will be ſo enriched with Dung, that it will bring a good Sward upon it, and graze well many Years after.

The Dung of *Sheep* is undoubtedly a rich and valuable Manure, and highly prized by thoſe who know how to uſe it; eſpecially in all cold and ſtiff Lands. But it is to be obſerved, that it is much better for Tillage than Paſture; accordingly the Husbandman thinks he cannot do well without it. But becauſe it cannot be ſo conveniently gathered together in Quantities as other Dung, it is commonly conveyed by folding the Sheep themſelves thereupon: By which means both the Urine and the Dung is ſaved; which ought, as ſoon as poſſible, to be turned in with the Plough, leſt it be expoſed and weakened too much by the Heat of the Sun In many Places they fold their Sheep on Rye-Lands after the Rye is come up, rightly judging that the freſher the Dung is, the more it fertilizes; and though it ſhould ſeem that the Rye is much damaged by the treading and Layer of the Sheep, yet it is found quite otherwiſe. In the open Fields the Manure ariſing from the Sheep is valued as much as the Wool; and I cannot ſee why it ſhould not be uſed the ſame Way amongſt Incloſures, folding the Sheep at leaſt all the Summer on the Fallows, and driving them again to their Paſtures in the Day-time; where the want of that Manure may be much eaſier and with greater Advantage ſupplied by Cart-Dung proper and ſuitable to the Soil.

A ſtronger Sort of Dung ſtill, and much fuller of Nitre, is that which is taken from the *Dove-houſe*; the Dung of *Pidgeons* being of ſo ſtrong and hot a Nature, that if it be only ſowed upon a Crop of Corn, and Rain ſucceed to put the Salts in motion, a wonderful Increaſe may be expected even on the moſt barren Land; and it hath the ſame Effect on Meadow-Ground for Hay. Twenty or thirty Buſhels will ſow an Acre, which is a very convenient Improvement, where Land lieth at a diſtance, and where other Manure cannot conveniently be carried; only it is to be obſerved, that it anſwers but for One Year, the greateſt part of its Virtue being loſt the Second.

The Dungs of other Poultry are all proportionably good and nitrous; though none of them ſo ſtrong as Pidgeon-Dung. I had a Curioſity once to try the Strength of Dungs by the help of the Microſcope, which anſwered my Expectations very well. Thus: I diſſolved a ſmall Quantity of Salt-Petre in a ſpoonful of Water; what the Point of a Needle would take up from thence, I laid on the Glaſs, and found by one of the leaſt Magnifiers a multitude of tranſparent Columns of Chryſtal of different Magnitudes, lying ſome parallel and ſome tranſverſe, affording in the whole a pretty and beautiful Sight. Then I diſſolved the ſame Quantity of Pidgeon's Dung in the like Quantity of Water, expecting to find ſomething of the ſame tranſparent Chryſtals; which accordingly were manifeſt to the Eye, though ſmaller and fewer in Number, becauſe mixt with other groſs Matter. I repeated the Obſervation with the Dung of Poultry, and found here and there ſome ſmall confuſed Chryſtalline Matter; the Quantity whereof was yet plainly leſs when I came to examine the Strength of Horſe and Cow-Dung. I went no further. But thus, I think, may plainly be diſcovered the proportionable Strength and Virtue of all Sorts of Dungs.

Concerning other MATERIALS *to be uſed as Helps for Vegetation, and proper for Improvements.*

THERE is no manner of Queſtion to be made, but that all Sorts of Soils and Earths, of what Nature ſoever, may be made more fertile and fitter for Vegetation than naturally they are, by mixing therewith ſuch proper Materials as are found by Experience to help and aſſiſt the Powers of Nature; inaſmuch as if they are rightly choſen, they agitate and ſet in Motion ſuch minute Parts of Terreſtrial Matter as give Life to every Plant, and thereby giving it a Power to continue and increaſe its own Kind and Species. The whole Art of Agriculture depends upon this: inſomuch as when the Nature of the Soil, and the Quality and Quantity of all adventitious Materials to be ſuperinduced is thoroughly underſtood, the whole Myſtery of Vegetation and Improvement is made plain, eaſy and familiar. For which purpoſe, I cannot but recommend, what I think is univerſally agreed on to be moſt agreeable to Reaſon as well as Experience, *viz.* the Aſhes † of any manner of burnt Vegetables; for by ſuch Burning is waſted the more phlegmatick and uſeleſs Moiſture, and at the ſame time are fixed the more ſolid and ſubſtantial Parts of Vegetable Nature. This Effect the Fire is obſerved to have on the Turf or Surface of the Earth full of Roots and Fibres. For the oily Matter, that is left by the Fire in a moderate proportion applied to any Earth, highly enriches it; as appears by the vulgar Experiment of *Denſhiring* or *Burn-bating* of Land, which by that means yield ſo fair Crops of all Sorts of Grain. In which Operation the Ruſtick obſerves, that over-burning the Turf is rather injurious than helpful: Which is exactly agreeable to an Obſervation I have made in *Wiltſhire* upon *Salisbury Plain*. For where they have happened to lay up the Turfs in too great Heaps, the exceſſive Fire and Heat required to reduce them to Aſhes, hath been nicely obſerved to *over-burn* the Earth; inſomuch that the Salts and Spirits, ſo neceſſary to Vegetation, and ſo much ſought for by that Practice, plainly evaporate and fly away; which yet a more moderate Heat, by laying the Materials on leſſer Heaps, would prevent, and the Husbandman's Expectations would be better anſwered. For indeed, the Reaſon is plain, as was hinted before; In the burning of any Vegetable, a gentle, eaſy and ſmothering Fire doth not waſte the volatile nitrous Spirit ſo much as a quick one; but cauſeth much more of it to fix and remain behind.

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† ————————*ne pudet*
Effœtos cinerem immundum jactare per Agros. Virg.

Fixt Salts, that are thus obtained, are the grand and principal Treaſure ſo much ſought for and celebrated for Improvements of Land, to render it more fruitful; although there are many other Salts near in Affinity to theſe, that do alſo greatly meliorate and fertilize the Earth. As, for inſtance, *Rags* of all Sorts, as well Linnen as Woollen; as alſo Shreads of Leather, old Shoes, Hats and Stockings. All theſe Refuſe Things, generally thrown away as worth nothing, have a marvellous Virtue in them for fertilizing Land for Corn; eſpecially if they be cut into ſmall Pieces, and ſtrewed upon the Fallows. One Load of theſe Refuſe Things is valued by the Farmers in *Hartfordſhire*, as worth more than Ten Load of the beſt Dung; and accordingly they fetch them at a great Expence from *London*, where they can get them in Quantities. I have often wondered to ſee them lye neglected in ſuch populous Places as *Newcaſtle* and *Sunderland*, even to the great Annoyance of the High-Ways; from whence yet the Farmers fetch Dung from all Quarters, at a pretty great Expence. It is to be hoped they will ſoon grow wiſer, when once they come to underſtand ſuch Wiſdom will make them rich. Beſides theſe, there are a great many other Refuſe Things, which contain in them a rich fertile Salt. Aſhes of all Sorts are very good; but the beſt are thoſe from the Sea-Coal, eſpecially for cold Land, and the Meadow or Paſture-Ground; for it is obſerved to have a ſtrange Property of making the Soil run much to Clover-Graſs or Trefoil, which of all others is the ſweeteſt and the richeſt Feed for Cattle. Throughout the whole Biſhoprick of *Durham* (one of the fineſt, I think, and richeſt Counties in *Great Britain*) there are vaſt Quantities of theſe Aſhes made, on the Account of the great Plenty of Coal-Mines found therein; of which I ſhall ſpeak more in its proper Place. But whereas every, even the meaneſt Family, is ſupplied and refreſhed with plenty of Fuel at a trifling Expence, the Aſhes of Sea-Coal are made in ſuch great abundance, that it is ſurpriſing to obſerve what Riches, what vaſt Improvements have of late Years been made all over the Country, ſince they came to underſtand and experience the fertilizing Nature of theſe Aſhes. But indeed, the late Improvements are ſtill much greater near all populous Places along the Sea-Coaſts, where great Quantities of Sea-Sand are made uſe of by the cleanly Houſewives: For *That* mixing with the Aſhes and other Kitchen and Stable Dung, not only increaſeth the Quantity, but alſo improves the Quality, heightening and fermenting the fertilizing Nature of Both; agreeable to that Maxim already laid down, *That heterogeneous Soils or Dungs, and Soils of the moſt contrary Nature, are moſt proper and moſt neceſſary for Vegetation.*

But indeed *Sea-Sand* is of itſelf a noble Manure for all Clay cold Land, having a double Influence there, by adding to the Salts of the Earth; and as it ſeparates the Parts of the Clay, helps to put thoſe Salts in Motion. Wherefore it is very adviſable to fetch the Sea-Sand from ſuch Places, where it has been lately overflowed with the Tides, while it is yet moiſt and well impregnated with the Salt Water; and not from ſuch Places, where it has lain ſome time dry, and is become *ſlippery*. The not obſerving this, hath been the Occaſion of great Diſappointment to the Farmer's Expectation. For barren Sand, though it may be good to ſeparate the Parts of a Clay-Soil, that of itſelf is rich enough, and ſo diſpoſe it for Vegetation; yet it will not fertilize hungry Land, except it be well impregnated with Salts, or with ſomething analogous to it, *viz*, Nitre, Sulphur, or ſome fat unctuous Waſh of Earth.

This is that which makes what is commonly called *Drift-Sand* ſo very valuable; that is to ſay, all ſuch Soil and Sand as is wont to be driven on Heaps in Brooks, or Rivers, by Land-Floods in the Winter or Spring; which being forced from the Surface of the Up-Lands, either Tillage or Paſture, impregnated by Manure or Dung of Cattle, hath an uncommon Fertility in it; and therefore ſhould be highly prized by the Husbandman, and carried in proper Seaſon to ſuch Up-Lands as moſt want it.

Sir *Hugh Plat* recommends the Uſe of Soap-Aſhes after the Boilers have done with them, both for Corn and Graſs. The common Allowance is eight Load to an Acre; and if it is laid ſomething thick where Furze, Broom, and Fern grow, it is thought it will entirely deſtroy them, eſpecially if applied after grubbing at *Midſummer*.

Soot is, I think, generally agreed on to be a good Manure for all cold Lands, and it is equally good both for Paſture and Tillage. Forty Buſhels laid upon an Acre will do Wonders, eſpecially if it be Soot from Sea-Coal, which is much the ſtrongeſt and fulleſt of Nitre.

Malt-Duſt is another great Improver of Land. And upon a Crop of Barley, which is obſerved to be weak and faint in *May*, if it be ſowed by the Hand, as they do the Seed, it will give a ſtrange Life and Increaſe to it, eſpecially if Rain follow. It ſeems to be near as ſtrong, and to have the ſame Effects, and conſequently ſhould be uſed much in the ſame manner as Pidgeons-Dung. Forty Buſhels of it may be allowed to an Acre; but you muſt expect the Advantage only in one Crop.

Tanners-Bark, Saw-Duſt, Fiſh, Fleſh; Bones, Hair, Horns, Hoofs, and Skins of Beaſts, are all generally known to add very much to the Improvement of Land, laid on in due Time and Proportion. And there is one Thing more which I cannot but mention, as containing a great deal of Salt, and therefore an Improver of Land; and that is, Sea-Weeds of all ſorts, but eſpecially what is generally known by the Name of *Wear*; of which by Burning they make *Kilp*, the chief Ingredient now of late made uſe of for making *Glaſs*. This *Weed* is oft-times of a large Subſtance, growing chiefly on ſuch Rocks as are covered at High-Water, and from thence is waſhed by the Waves on the Shores in great Quantities. From whence it might eaſily be gathered in Heaps, and carried away to the neighbouring Fallows, to the great and almoſt incredible Improvement of a ſingle ſucceeding Crop of Wheat or Barley.

All theſe Materials before-mention'd as proper for Improvements, are ſtill *further* improv'd by diſcreetly mixing them together, and by giving them a ſeaſonable Fermentation; and if Convenience and Leiſure permit, the beſt way is, near the Houſe and in the Farm-Yard, to make a Pit in Length and Breadth according to the Quantity of Soil, paving it with Stone or Chalk, that it may detain the Moiſture of the Dung in order to its better Rotting and Fermentation. And becauſe over-much or haſty Rains are apt to carry away the Salt of the Dung with it, which is the chief Cauſe of its Fertility, it will be proper to lay it as thick on Heaps as may be, rounded at the Top like an Egg, covering it alſo with Turf to prevent the Sun and Wind from exhaling and drying up its Virtue. For the well *preparing* of Dung, and the *Increaſe* of its Quantity, is an Art that ought be well ſtudied by the Husbandman, as a Thing of the laſt Importance towards the enriching both himſelf and his Farm: This being a certain Truth, that the Encreaſe of the Crop will make an Encreaſe of the Dung; and ſo, on the contrary, a Decay and Failure in the Dung, makes a Decay and Failure in the Crop: And therefore (always including the Bleſſing of God) the Whole of the Profit, and the Value of the Farm, depends upon a due Care of thoſe two Points.

It will now eaſily be thought that I have hitherto forgot ſome material Articles relating to Improvement, and ſuch too as have been found by repeated Experience to be great Helps both to the Grazier and the Farmer. But I have choſen to reſerve them for *Chapters* by themſelves, becauſe their Nature and Uſe is ſomething more difficult and intricate; and yet deſerve to be thoroughly underſtood.

Of LIME.

IT is not many Years ſince *Lime* was brought into ſo great Repute, and become of ſuch general Uſe in the Way of Husbandry and Improvement of Corn Land. But it is now ſo well underſtood, and ſo much coveted, that the induſtrious Farmer thinks almoſt no Pains or Coſt too much to procure it. But neither is the Knowledge and Uſe of This become ſo univerſal as it ought; and therefore I ſhall briefly deſcribe its Nature, and recommend its Uſe, where it can be had at any tolerable eaſy rate, as being ſo noble an Improver of Tillage. Lime is commonly made of Chalk, or of any Sort of Stone, that is neither ſandy, nor porous and cold, as Free-Stone, *&c.* All Sorts of grey Stone, ſuch as, if you break it, will yield a white Powder; all Sorts of Marble, Alabaſter, Slate, Oyſter, and other Sea-fiſh Shells; as likewiſe Flints will make an extraordinary Lime, though they be hard to burn: for the harder the Chalk and the Stones are, the better is the Lime. All Sorts may be burnt with Wood, Coals, Furze or Fern. And ſuch is the Felicity of the County Palatine of *Durham*, that through the very Middle of the County runs a large Vein of the beſt Lime-ſtone in *England*, generally pretty eaſy to win, and at the ſame time the beſt Coal in almoſt every part to burn it with. Chalk is commonly burnt in twenty-four Hours; but the right Lime-ſtone oft takes up ſixty. This Laſt, as it is beſt for all other Uſes, ſo it is obſerved to be beſt for Land; chiefly for light ſandy Soils, or loamy mixt Gravels. It is carryed upon the Fallows in Summer, and laid in ſmall Heaps till Rain comes to diſſolve it; and then it is ſpread abroad. Some mix Mud or freſh Earth with it, and ſometimes Cow-Dung; all theſe tending to fix and ſtay the Salts contained therein. Thoſe that are moſt acquainted with the Uſe of it, generally allow a hundred and fifty Buſhels to an Acre; but its Nature being to work downwards, as Chalk, it will not laſt above four or five Crops; and therefore if there be any Declivity in the Land, it is adviſable to lay the Subſtance of it chiefly on the upper Part; for it will much of it ſoon waſh down to the lower.

Of late Years, many of the Moors and waſte Grounds in ſome Parts of the Biſhoprick of *Durham* and in *Northumberland*, that were thought cold, barren and good for Nothing, are now turned into Arable Land; and ſo far improved by Lime and Incloſures, that what was not worth above *One* Shilling an Acre, is now become worth *Twenty*. And after having ſaid this, I think I need not add any thing farther to recommend the Uſe of Lime, although it ſhould be fetched eight or ten Miles off.

Of CHALK.

WHEN I ſpeak of *Chalk* here, I mention it not as a Land itſelf to be improved, but as a ſuperinduced Soil and Manure for other Land of a contrary Nature. There are ſeveral Sorts of *Chalk* for ſeveral Uſes: Some are ſo hard and ſo little apt to diſſolve, that they are by no means proper for Land, till burnt into Lime; the excellent Virtues and Properties whereof you have already heard. However there are other, and thoſe the more general Sorts, that are more unctuous and ſoluble; which being laid crude on Lands, either Paſture or Tillage, when once diſſolved by Froſts and Rains, cauſe great Fertility; eſpecially on ſuch Lands as are apt to loſe the Riches of Dungs laid on them, and to forget in a little time that they have had any kind and indulgent Benefactor. Here *Chalk* is of excellent Uſe to drive away ſuch Ingratitude, having a retentive Quality to encloſe and ſtay the Salts. According to which Obſervation it hath been alſo found, that if Land, which is chalked, is not at the ſame time kept in Heart by a mixture of Dung, it will receive but little Benefit by repeated Chalking: So that tho' for a time it may make the Tenant *rich*, yet it may ſo happen that it will make the Landlord *poor*. For which Reaſon, the moſt approved Practice for a *laſting* Succeſs, is to mix a convenient Quantity of rich Earth, or Dungs of Animals, or Vegetables, laying all together up in Heaps to ferment and incorporate. One Load of Chalk to two Loads of Dung, or other rich Earth, is a much better and more laſting Manure than Dung alone; eſpecially for all cold, ſour, gravelly Land, where it will cauſe an abundant Fertility. On Tillage it will produce incredible Crops of Corn for ſeveral Years together, if about twenty Loads of the aforeſaid Compoſition be laid on an Acre; and when the Time of Tillage is expired, twenty or thirty Load of Chalk alone will do Wonders upon an Acre of Meadow or Paſture; having with it that ſingular good Quality of ſweetening the Graſs, thereby cauſing all Sorts of Cattle to thrive and grow fat ſpeedily, as well as Cows to give ſweet and thick Milk.

Mr. *Mortimer* tells us of a good ſaving way of digging Chalk in *Kent*, which it may not be amiſs to inform the Reader of, *viz.* where they dig it on the Sides of Hills, they undermine the Bottom of the Chalk ſo far as they would have it fall; and upon the Top, ſo far as they have undermined the Bottom, they dig a ſmall Trench, which they fill with Water; which in about a Night's time will ſoak to the Bottom, and cauſe a Flake from Top to Bottom to fall the Breadth of the Place undermined; which ſaves a great deal of Labour and Danger: But as Chalk in moſt Places lieth a great Depth under the Earth, there they commonly dig for it in the ſame manner as the Miners carry on the Shafts of their Mines, and draw it up with Buckets.

N. B. What hath been ſaid above concerning the Nature of *Chalk*, and its Uſe for Improvement of Land, may be applied alſo to moſt Sorts of rich Clays, ſuch eſpecially as are apt to *fall* when well ſoaked with Rain. And if they are uſed with Diſcretion, and in the abovesaid Proportion laid on Land of a quite contrary Nature, they will produce much the ſame deſirable Improvements; which yet will be better underſtood, when I have ſpoke ſomething more particularly of the Nature of Clay and clayey Land.

Of CLAY, *and* CLAYEY LAND.

CLAY is one of the Sorts of Earths that is uſeful for a great many Purpoſes relating both to Husbandry and Trade. And of Clay there are vaſt Varieties, as they are mixed with various Proportions of Sand or other Matter: A Liſt of ſome of which is to be found in the *Philoſophical Tranſactions*; and is as follows.

Fullers Earth. Yellowiſh, at *Brickhill* in *Northamptonſhire*; and under the *Yorkſhire* Woolds: Brown, about *Hallifax:* White, in *Derbyſhire* Lead-Mines: Boli, in *Cleveland*, at *Linton upon Wharf:* Pale yellow, in the Marle-pit at *Ripley:* Cow-ſhot Clay, or the Soap-Scale lying in Coal-Mines: A dark blue Clay, or Marle, at *Tolthorp*, *Harſh and Duſty when dry. Creta*, ſo called, or the Milk White Clay of the *Iſle* of *Wight:* The Potters pale yellow Clay of *Wakefield Moor:* The blue Clay of *Bullingbrook* Pottery in *Lincolnſhire:* A blue Clay in *Bugthorp Beck*, and at *Yelvertoft* in *Northamptonſhire*; in which the *Aſtroites* are found: Yellow Clay, in the Seams of the Red-Sand Rock at *Bilbro:* Fine Red Clay, in Red-Sand Rock, at *Bilbro* and *Rippon:* A ſoft Chalky blue Clay, and a ſoft Chalky red Clay, at *Buttercrain*, *Stoney when dry:* A red Stone Clay, in the Banks of *Whitcar Beck*, near *Leppington*; and at *Houſam:* A blue Stone Clay, at the ſame Places: *Clunch*, a White Stone Clay in *Cambridgeſhire*, *mixt with round Sand or Pebble:* The yellow Loam of *Skipwith Moor*, *Yorkſhire:* A red ſandy Clay in the Right-hand Bank of the Road beyond *Collingham*, near the Lime-Kilns: A red ſandy Clay in the Red-Sand Rock near *Rippon*, *with flat or thin Sand*, *glittering with* Mica: Crouch White Clay in *Derbyſhire*, of which the Glaſs Pots are made at *Nottingham:* Grey or blueiſh Tobacco-Pipe Clay at *Hallifax:* A red Clay in the Red-Sand Rock at *Rotherham*.

This Liſt of Clays amounts to two and twenty Sorts; and doubtleſs there are many others in this Kingdom. The Clay moſt deſirable for the Husbandman's Uſe, has in it about a fourth part of fine Sand, with a little Quantity of Salt; being an *Alkali* endued with ſome Particles of Iron, which may be drawn forth by the Load-ſtone. Several Chymiſts allow the Moiſture of all Earths to be compoſed of the Spirit of the Air about the Place it is found; and ſo, as it ſucks in the Rain, Snow, or Dew, it ſucks in all that can be carried with them; and from thence, by Chymical Art, may ſuch Matter be extracted: Although it is probable, that the ſtiffer the Clay is, the leſs it receives from the Air; becauſe in a great meaſure it reſiſts the Penetration of Water, which with the Cloſeneſs of it, that hinders in ſome meaſure the growing of Plants through, may be the Reaſon of its tending ſo much to Barrenneſs. But the more it is mixt with Sand, or other Matter that keeps it aſunder, (except in too great a Quantity) the more Nitre it receives, and is the more fruitful.

Exceeding thick Clay is worſt for the Husbandman; but that mixed with Sand, Black Mould, or other Earth, in ſuch a degree of Stiffneſs as to bear Wheat, Barley, Beans, or other hard Corn, I take to be good Land, for it will diſſolve and receive the Rains and Nitre; ſuch is Hazle-Mould, which is chiefly a Compoſition of Clay and Black Mould; and this is of ſuch a Temper as to be tolerably good for moſt Sorts of Corn: But as it tends more to Clay, it is fitter for the hardeſt Corn, as is the Black Mould or Sand for the lighter; and if it be in Extremes, it muſt be mended by Superinductions.

The Culture of that Land which tends moſt towards Clay, and is called Clay-Ground, ſhould be agreeable to the Practice of *Staffordſhire*, *Northamptonſhire*, and *Leiceſterſhire*; where they keep it (if it lyes in a Common Field) always in Tillage, ſowing it Two Years, and letting it lye fallow the Third. They lay it in Ridges, or otherwiſe, according to the Temper of their Land; and make their Fallows towards the latter End of *March*, or Beginning of *April*, a little before the ſecond Ploughing, which is commonly about the Middle of *June*. It is manured generally with Cow or Horſe-Dung, unleſs when folded with Sheep; then it is immediately ſpread, and caſt under Furrow with the Plough, leſt the Rain and Sun ſhould weaken it. About the latter End of *Auguſt* it is ploughed again to kill the Weeds, and turn up the Manure, that ſo they may return it again to their Seed at the laſt Ploughing, when they ſow, which is uſually the Week before or after *Michaelmas*.

The Land thus prepared is ſown with Wheat, &c. as directed under *Ploughing* and *Sowing*: But if Clay or Light Land be incloſed, they are capable of Improvement by Marle, eſpecially Salt-Marle, which with Rain runs like Lime, and never binds the ſtiffeſt Clay, but looſeneth, ſo that after eight or nine Crops it yields good Graſs: Whereas Clay-Marle ſo binds the Surface, that though there will be ſeven or eight Crops of Corn, yet the Ground is ill diſpoſed for Graſs, unleſs well manured with Muck and Lime mixed; which ſome lay on a Fallow, others when they plough for Corn; either Way it will produce two or three Crops more, and ſo mend the binding Quality of the Marle, that the Land will yield as good Graſs as if otherwiſe improved. If Clay be mixed with Gravel or Sand (which is not often very rich) it hath much the ſame Tillage as Clay and Light Mould; but it is uſually ſown with what is called *Muncorn*, or *Miſcellane*, in the Place of Wheat.

By what hath been ſaid, it may eaſily be perceived that Clay laid on ſandy Ground makes a great Improvement: And barren Clays may be much more improved by Sea-Sand, when managed as follows: The Land muſt be well ploughed and hacked, and have ſixty or eighty Buſhels of Sea-Sand on every Acre, well ſpread and mixed among it; and after that at leaſt forty or fifty Buſhels of Lime as well mixed; and then good ſtore of Ox, Cow, or Horſe-Dung, rotted Straw, Mud of Lakes, *&c.* which is to be done between the Beginning of *May* and the End of *September*. In *October* this Land ſhould ploughed again deeper than before, and alſo hacked and harrowed to have it fine; which done, it muſt be plentifully ſown with the beſt Wheat for the firſt Two Years; and the next (by a Folding of Sheep) with Barley; the next Three Years with Oats; and the Seventh it may be ſown with Garden-Peaſe or Beans; after which, if laid down, it will yield good Graſs In Places where Sea-Sand cannot be gotten, *Liming* is good Huſbandry, with the ſowing of two Buſhels of dry Bay-Salt; as alſo Brining and Liming the Seed.

Mr. *Evelyn* gives ſeveral Accounts of Clays, all tenacious of Water on the Surface, where it ſtagnates and chills the Plant; and in dry Seaſons it hardens with the Sun and Wind; ſo that moſt Clays of themſelves are pernicious and untractable. The Blue, White, and Red Clay, if ſtrong, are to be ſure all unkind; the Stony and Looſer ſometimes tolerable; but the light Brick Earth will do very well with moſt Fruit-Trees. But unmixed Clay is rightly enough called a curſt Step-Dame to almoſt all Vegetation; having few or no Paſſages for the receiving of Nouriſhing Showers, or Expanſion of the Roots, and at the ſame time *cloſing* and *fixing* the earthy Particles proper for Vegetation. The White and Blue Clay (commonly the beſt Paſture) are worſt for Wood; but the Oak will proſper in it, and for Toughneſs is to be preferred; for *Chaucer*'s great Oak grew in a gravelly Clay, moiſtened with ſmall and frequent Springs. It is by all allowed, that the Fir, Pine, Pitch-Tree will thrive mainly in a clayey Soil: But Foreſt-Trees ought to be ſet near the Surface in the moiſt Clays.

For mending of ſtubborn Clays, Laxatives are preſcribed, ſuch as Sand, Gravel, Saw-Duſt, Marle and Chalk; but, above all, Sea-Sand and Burning. Many commend Rotten Wood, and Soot, and Rubbiſh of Brick and Lime-ſtones to be laid at Bottom, with Compoſts of Dung on the Top: By digging of deep Trenches in Graſs Ground, it will be a great Improvement of a clayey Soil; for this Land ought to lye dry for Graſs. And beſides what relates to Culture, Clay is very uſeful in ſuch light Grounds where Ponds are wanting, and the Water ſinks all away. Here, if Clay be well rammed, and upon that a good Pitching of Stones be laid, Water may be preſerved to good Purpoſe.

As to Tobacco-Pipe Clay, a good Sort of it is gotten at *Northampton*, at a Place near *Pool* in *Dorſetſhire*, and in the *Iſle* of *Wight*; where it is dug in ſquare Pieces of the bigneſs of about half a Hundred Weight each; from thence it is brought to *London*, and ſold at about Twenty Shillings the Tun. This Clay, while green or freſh, feels fat and ſlippery, like Soap, and gliſtens; it will fetch out Greaſe like Fullers Earth; and being dryed before worked, and afterwards watered, it will work like Paſte, from which are taken Pieces big enough to make Pipes, *&c.*

Clay is the uſual Wrapper (mixed with Horſe-Dung and Water) for Trees grafted. It makes Walls for Houſes, for the poorer Sort of People, being well tempered and mixed with Straw. When Coals have been dear, Lumps of Clay, mixed with the ſmalleſt Coal, have been uſed for Fewel; and by help of Fire it makes a great many good Manufactures.

If Clay be laid on dry to any Wound or Ulcer, it will ſuck up ſome of the Moiſture, and with it ſome foul Matter will ſtick, and be taken off; and ſo the drier and cooler the Wound or Ulcer is, the ſooner it will heal.

MARLE, *its Improvement of Lands.*

MARLE is not improperly called the Ointment of the Earth: For it is a ſlippery ſort of Earth, like *Caſtile*-Soap to the outward Touch, and will crumble or diſſolve.

We are told of five Sorts of Marle; the Cowſhut Marle, Stone or Shale Marle, Peat or Delving Marle, Clay Marle, and Steel Marle; the great Advantages of all which are very obvious and rational.

Mr. *Evelyn*, in his *Philoſophical Diſcourſe of Earth*, ſays, *Marle* is commonly met with and taken out of Pits at ſeveral Depths, and is of divers Colours, *Red*, *White*, *Grey*, *Blue*; all unctuous, of a ſlippery Nature: The beſt is moſt pure and unmixed, for it ſooner relents after a Shower, and when dried ſlackens, and crumbles into Duſt, without growing hard again.

Marle is of excellent Uſe to fix light Sand and dry Grounds: Some are for the White and Grey, and others the Blue and Red, according as it is more or leſs apt to reſolve after wetting; but it is to be obſerved, that neither of them diſcover their Virtue till after the firſt Year. It does incomparably well on Paſtures; and ſome, if right mixed, on Arable. But it has been diſputed, whether Marle has any fertilizing Qualities of it ſelf, becauſe it doth not ſend forth the firſt Year: But without doubt its lying a Year above Ground, and being calcined by the Sun, makes it a fit Recipient for the Nitre of the Air, which is judged to be one great Cauſe of Fertility.

We are told, that at *Dunhead St. Andrews*, their White Marle for ſeven or eight Years bringeth great Profit, and ſeven Years more it will do the ſame with Sheepfold and Foddering, *&c.* but after twenty Years it hath been weakly reckoned ill for the Soil; although repeated Practice contradicts it.

It is the Practice of ſome to burn Marle as Lime; and ſo uſed, it is thought, it much improves the Land: For three good Crops may be had from a Marling, *viz.* Wheat, Peaſe, and Wheat again. It is uſual to lay Three hundred Loads on an Acre raw; but Sixty Loads when burnt will do: And it is obſervable, burnt Marle makes mighty ſweet Feed for Cattle.

Lay Marle out in the beginning of Winter, and it cloſes like Clay, if the Wet take it; but Dung, and Soil, or Lime, cures it again. I take this to be a farther Argument for Nitre, and that what we lay on Land is chiefly to receive it; for you ſee when it is firſt filled with Wet, there is no room for Nitre; but when it is warmed by Dung, *&c.* that cauſes a Ferment, and it grows drier; then it is good again.

The Signs of blue Marle is, when in Ditches, Highways, *&c.* in fair Weather the Ground is candied like a white Froſt, which is the Nitre in the Marle, and what properly ſpeaking makes it ſo fruitful; and its only Quality is reckoned to be the chief Cauſe of its contracting ſo much of the Salt or Nitre of the Air: For which Reaſon moſt think, the longer it is expoſed to the Air the better; which juſtifies the Practice of thoſe who lay it on Graſs Ground three or four Years before they admit the Plough, and then alſo take care not to plough above an Inch into the natural Soil, leſt it be buried or work too much downwards, as it is very apt to do; though not ſo much as *Lime*.

There are ſeveral Ways of diſcovering and diſtinguiſhing *Marles*, and their Goodneſs: But there being ſuch great Varieties, to give any one general certain Rule, is hardly poſſible. Its oily unctuous ſlippery Nature, diſcoverable by the Touch, is a very good Indication of a right Sort, eſpecially if it be pure and unmixt, and will diſſolve in Water. However, thoſe which are not unmixt, and are of a hard Nature when firſt dug, are not to be rejected; becauſe Froſt, Rain and Sun-ſhine will diſſolve them, and diſcover their good and fertilizing Qualities. There are few Counties in *England* deſtitute of it: But happy are they who have Land near it, wanting to be improved. Amongſt the reſt of the Riches of the Biſhoprick of *Durham, this* alſo is found in many Places in great abundance, eſpecially at or near the Lime-ſtone Quarries: And although the Husbandmen do not yet generally come into this Improvement, for want of a right Knowledge; yet it is hardly credible to report what Wonders it will do when rightly adjuſted and proportioned. For herein indeed lieth the great Myſtery and the chief Advantage, *to ſuit the Land and the Marle together*. Neither can there herein be given any other more certain and general Rule than this, That Contrarieties being the Principles on which the Improvements in Vegetation are founded; Marle being of a *cooling, binding* and *ſaddening* Nature, all *light, open* and *warm* Land is a fit Recipient for it; and ſo, on the contrary, moſt Sorts of Clay being in their own Nature *cold* and *binding*, will be rather prejudiced by it: though even in this Conſideration the Nature both of the Clays and the Marles ought to be well underſtood before their Mixture be rejected. Therefore, upon the whole, inſtead of giving more general Rules, which would admit of great Exceptions, I would adviſe Trials and Experiments in ſmall Quantities. Try a Load or two upon each particular ſort of Soil you have, and in different Proportions; and according to the Succeſs form your Judgment and your Practice: And by this means you will ſoon diſcover better and ſurer Rules, by which to know the Riches and Profit of *Marle*, than can be afforded by any Reaſoning or philoſophical Diſſertation.

I have already obſerved, that light, ſandy and gravelly Soils are fitteſt for the heavy Nature of *Marle*; but yet, I believe, the greateſt Difficulty relating to Clays would be removed, if the Land lay perfectly dry. However, all mixed Soils, be they never ſo poor and not apt to be floated, will receive unqueſtionable Benefit. It may be laid on, either before or after Winter; and as to the Proportion or Quantity, it is better to err in laying *too little* than *too much*. The common Practice is from two hundred to four hundred Load to an Acre: But as its Nature is ſomething like that of *Lime*, to work *downwards*; if the Field lie on a Slope, the beſt Way is to lay the greateſt Part on the greateſt Elevation. From hence, however, it will be eaſily gathered, that the moſt deſirable Situation for *Marle*, is a Flat, or ſomething near it. When ſuch Land is *marled* with Diſcretion, or with a Judgment formed from Experience, you may behold it as vaſtly improved for at leaſt Thirty Years. Only it is to be noted, that if you keep it in Tillage and Paſture interchangeably, (which is indeed moſt adviſable) you muſt give it a Sprinkling of Dung for every Crop of Wheat; and this will keep the Land in a perfect State of Health, and help to looſen the binding Quality of the *Marle*.

BLOOD, *its Uſe in Improvement of Land*, &c.

BLOOD is uſeful to many Purpoſes. At the *Wyches* in *Cheſhire*, the Salt is purified with Blood; I preſume, for the ſame Reaſon, we purify other Matters with Whites of Eggs. But what is to our preſent Purpoſe, is, that Blood is an excellent Dung, having in itſelf all the Principles of Fertility, becauſe 'tis alkalous, as we ſee by Spirit of Blood; and imbibes the Nitre, as indeed all Animal Subſtances will. Mr. *Evelyn*, in his *Philoſophical Diſcourſe of Earth*, ſays, Blood is an excellent Mixture almoſt with any Soil, even where Fruits are planted, eſpecially Mural; and of great Advantage to the Grape, poured about the Roots diluted. He tells us, that after the Battle of *Badnum* in *Devonſhire*, the Blood of the Slain did ſo fertilize the Fields, where Corn had been ſown a little before, that the Year following produc'd ſo extraordinary a Crop, as moſt of the Wheat-Stalks bare from two to fourteen Ears. The Owner, by Reaſon of its treading, thought to have re-ſown the Land, but was diſſuaded from it, and it happened as above. Mr. *Evelyn* alſo ſays, that Lime temper'd with Blood extraordinarily improves its fertilizing Quality; and this is caus'd, I preſume, by its ſpiritous Nature.

It is generally thought that the old Walls, ſo remarkable for their impenetrable Hardneſs, have had their Mortar mix'd up with Blood; the Gluineſs whereof has ſo well held it together, as it hath grown into a Stone. Some, when they have ſalted Beef, and barrel'd it up, will rub the Joinings at each End with Blood; and when it is dry, it will ſerve as Roſin to keep the Veſſel tight and free from Air.

Blood makes very good Medicines; and from it may be drawn Spirits, Oil, *&c.* like thoſe of Hartſhorn: And it is not doubted but it will make good Oil of Aſper, to catch Fiſh with.

Since then the Blood of all Sorts of Animals in its Nature, and, for outward Applications, is ſo uſeful to Mankind; what pity is it (ſay many learned and good Divines) that any Portion of it ſhould be waſted in heightening an unnatural Savour to Meats and Sauces, whilſt they ſee a Prohibition appearing with, and carrying ſuch a Face of Authority, as * Scripture, Councils, Canons, Fathers, Imperial Conſtitutions, and univerſal Practice, unleſs in theſe Weſtern Parts of the World.

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* Gen. ix 4. Lev. iii. 17. Lev. vii. 26, 27. Lev. xix. 26. Lev. xvii. 10. Deut. xii. 16, 23. Deut. xv. 23. 1 Sam. xiv. 32, 33. Ezek. xxxiii. 25. Acts xv. 20, 29. Acts xxi. 25.

Modeſty, and a becoming Deference to the Opinion and Practice of good and great Men, more learned and wiſer than my ſelf, readily reſtrain *me* from interpoſing or calling in queſtion the Judgment of Thoſe, who juſtify their Practice, and the Indulgence, from thoſe general Words of our Saviour, (*Matth.* xv. 11.) I ſhall therefore only call in the modeſt Obſervations of my learned and often cited Author, Mr. *Evelyn*, who expreſſes himſelf * "in wonder how it happened, that ſo "ſtrict, ſo ſolemn, and famous a Sanction, not upon a *ceremonial* Ac-"count, but (as ſome affirm) a *moral*, and perpetual from *Noah*, to "whom the Conceſſion of eating Fleſh was granted, and that of Blood "forbidden, ſhould not to this Day be once revoked; and whilſt there "alſo ſeem to lie fairer Proofs than for moſt other Controverſies agi-"tated among Chriſtians, ſhould be ſo generally forgotten, and give Place "to ſo many other impertinent Diſputes and Cavils about ſuperſtitious Fop-"peries, which frequently end in Blood and Cutting of Throats. As to "the Reaſon of this Prohibition, (its ſavouring of Cruelty excepted; and "that by *Galen*, and other experienced Phyſicians, the eating of Blood "is condemned as unwholeſome, cauſing Indigeſtions and Obſtructions;) "if a poſitive Command of Almighty God were not enough, it ſeems "ſufficiently intimated, becauſe Blood was the Vehicle of the Life "and Animal Soul of the Creature; for what other myſterious Cauſe, "as happily its being always dedicated to expiatory Sacrifices, *&c.* it "is not for Us to enquire. It is ſaid, that *Juſtin Martyr* being "asked, why the Chriſtians of his Time were permitted the Eating of "Fleſh and not the Blood? readily anſwered; *That God might diſtin-"guiſh them from Beaſts, which eat them Both together.* It is like-"wiſe urged, that by the Apoſtolical Synod, (when the reſt of the "*Jewiſh* Ceremonies and Types were aboliſhed) this Prohibition was "mentioned as a Thing † Neceſſary, and ranked with Idolatry, which "was not to be local or temporary, but univerſally enjoyned to con-"verted Strangers and Proſelytes, as well as *Jews*: Nor could the "Scandal of neglecting to obſerve it concern them alone, after ſo many "Ages as it was and ſtill is in continual Uſe, and thoſe who tranſgreſſed "ſo ſeverely puniſhed, as by an Imperial Law to be ſcourged to Blood "and Bone. Indeed, ſo terrible was the Interdiction, that Idolatry ex-"cepted (which was alſo *moral* and *perpetual*) nothing in Scripture "ſeems to be more expreſs. But this by the way.

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* *Acetaria*, Page 157.

† Acts xv. 20, 29.

URINE, *for Improvement of Land*, &c.

FOR Improvement of Land, Mr. *John Woolridge*, in his *Syſtema Agriculturæ*, tells us, that the *Dutch* carefully preſerve their *Urine* to enrich their Ground. *Columella* ſays, old *Urine* is excellent for the Roots of Trees; that a Woman near *Canterbury* ſaved her Cows Urine to ſprinkle on her Meadow, which at firſt made the Graſs look yellow, but afterwards it grew wonderfully; and that Man's Urine is of great Uſe for the ſame purpoſe.

And without doubt, notwithſtanding what ſome Writers ſay to the contrary, it is of very great Service. The Obſervation of its poiſonous Nature, and its mortifying Trees and Plants where it falls, is what has brought it into diſrepute with ſome. But that is only the indiſcreet uſe of it, by the application of too great a Quantity, that makes it noxious; for even Dung it ſelf will have the ſame Effect for a time, where it is laid too thick. Therefore to make it anſwer the Ends of Vegetation, it ſhould always be diſcreetly mixed with Earth or Dung, before it is applied: For as it is alkalous, like Lime and Dung, it imbibes the aerial Nitre; and the ſtaler it is, it is more impregnated, and of greater Uſe, as it is with rotten Dung. And this may be conceived, if we conſider how Salts will encreaſe with the Air; for Salt and Tartar, if not kept very dry, will melt; and the ingenious Dr. *Gould* has proved, that Oil of Vitriol, if left open to the free Air, will encreaſe in Quantity.

Dr. *Plot*, in his *Natural Hiſtory of Staffordſhire*, and Mr. *Evelyn*, in his *Philoſophical Diſcourſe of Earth*, in divers Places, commend Urine; and, I think, for Improvement of Land (if rightly managed) it hardly has its Equal. The Salt of Urine is of the ſame Nature with Pot-aſh. They uſe a great deal of Urine in the making of Allom; the beſt is that which comes from poor Labouring People, who drink little ſtrong Drink: And it is obſerved, that thoſe yield moſt Salt, who waſh their Bodies with Drink leaſt.

Urine ſeems much to agree with Tartarous Lees: not only becauſe Urine is a Lee made of Vegetables in the Bodies of Animals; nor becauſe in the Receptacles of Urines, Tartarous Stones are bred, like as in Veſſels of Wine; nor becauſe Urine diſchargeth and abateth Colours, as Lees of Tartar, or the diſſolved Salts of Tartar, do; but becauſe Tartar and Sulphur Lees do colour the Superficies of Silver, as Urines. And the Difference I make between Urine and Tartarous Lees, is only this, that the Salts of both ſeem by their Effects in Dying in a manner the ſame; yet Urine is made and conſiſts of Salt and Sulphur both.

The ſtale Urine, or old Mud of Piſſing-Places, will colour a well ſcoured Piece of Silver into a golden Colour: And Urine fermented and diſtilled at the Flame of a Lamp, (by which are produced a Volatile urinous Salt and a Water,) has ſtrange Effects: The Fluid is ſuch, that if the Hands and Face are rubbed with it, and then the Party goes into a dark Place, he will look as if he was on Fire; and the Solid, though you can take it in your Hand, yet if you hold it long, it will burn you; wherefore it is kept in Water: But rub a Piece of this on Paper, it will ſet it on Fire; and if you write with it on Paper, nothing is ſeen; but carry it into a dark Room, and then you may plainly read it, and the Letters look as if they were Flame, but the Paper will not be burnt. This was very ſurpriſing till it was commonly known.

Where ſo great Improvements are expected and found from the Folding of Sheep on Ridges of Land for Wheat and Barley; thoſe who have made nice Obſervations, attribute more of the Riches to the Salts of the *Urine* of the Sheep, than of their *Dung*; and accordingly contrive, if poſſible, that their Sheep ſhall have acceſs to Water: for though they will live and thrive too *without* Water, yet it is rightly judged that the Improvement of the Land by Urine is much greater *with* it.

From Urine are drawn divers Medicines, and moſt ſeem to be of the Nature of Spirit of Hartſhorn. It is of it ſelf a good Medicine, both outward and inward; for it is often uſed with Succeſs for the Itch, and other cutaneous Diſtempers: It is reported, it will diſcuſs Tumours, and cure Gangreens and ſore Eyes, by reaſon of its volatile Salt; and for the ſame reaſon it helps Tertians, Dropſies, Jaundice, Stone, Gripings, and moſt Diſeaſes of Pain.

Urine is uſed among the Dyers; and in blue Vats it is made uſe of inſtead of Lime.

DIGGING, *its Improvement in Husbandry.*

SOME are of Opinion, that Digging of Land is preferable to the Plough; for by that means it is all deep enough, and you may have a great deal of freſh Mould, and can without Clods have it as fine and ſmooth as you will; neither is the Expence of it ſo great as ſome Perſons may think, it being done about *London* (as I am told) for Two-pence the Rod, or four Nobles the Acre; but I do not ſuppoſe it to be new Ground.

If it be thus; what is the extraordinary Charge of Digging, *&c.* may well-nigh be ſaved in the Seed; and it may be managed ſo as better to be preſerved from Birds or Vermin, and then you have the Goodneſs of the Soil into the Bargain. I have ſeen a great deal of Digging for Beans and Roots in Common Fields, on both Sides of *Ebbiſham* in *Surrey*, and other Places in *Barkſhire*; but yet I find the Gardeners near *London* love the Plough, and when their Land is well ploughed, they employ Men to hoe little croſs Furrows to lay Beans, or trill Peaſe in, and ſo with the Hoe again cover them. And why may not it be thus with Wheat?

The Hoe at all times will clear the Weeds, and ſupply the Grain with good Earth. If Land be ſhallow, I preſume it may be worth while to lay one Part of the Land upon the other, and there ſet; which; in ſmall Quantities, is eaſily tried.

Mr. *Worlidge* gives an Account, how that deep Ploughing may be as good as Digging; and quotes Mr. *Plat*, by that Management, to have a great increaſe of Corn. And Mr. *Houghton* adviſes the Country Farmers, to ſend their Sons they deſign to breed in their own Way, to live a Year or two with the Husbandmen about *London*, that are partly Gardeners and partly Ploughmen, or at leaſt to take ſome Servants that have been thus bred.

By this means they will be more acquainted with the Advantages both of Digging and Soiling their Lands.

The true Reaſon, I take it, why digging for Improvement of Land is not more practiſed about *London*, where no Diligence and Induſtry is wanting, is, becauſe there is no want of Dung; which, by frequent Repetitions, effectually cures Sterility, and makes the moſt barren Soil to produce Wonders: inſomuch that you ſhall ſeldom ſee any Land (eſpecially near the Navigation) within five Miles of *London*, to lye fallow. They only *Plough*, and *Dung*, and *Sow*, and every Year change their Crop; from *Wheat* to *Barley*, from *Barley* to *Peaſe* and *Beans*, and ſo *Wheat* again; ſtill keeping the Dung-Cart going, becauſe they have enough. But when once you are removed from the near and immediate Influence of ſuch Treaſures, I cannot but think (if the Soil be any whit deep and good, a Spade and half, for inſtance, or two Spade deep) it is an excellent piece of good Husbandry to go near as deep again as the Plough with the Spade, and ſo dig or trench the whole Field over; thereby throwing down that which is worn out to the Bottom, and raiſing up a new and freſh Soil, which may laſt four or five Crops together, without any other Advantage but continual ſtirring. This is no barren Theory or Notion; but the Uſe and Advantage thereof is ſupported by Practice and Experience; and it has been found, that the Charge, as above, is ſufficiently repaid and even doubled by the ſaving of Manure, and Ploughing, and a third part of the Seed.

But where the Soil is ſhallow, and nothing but either a barren Clay, Gravel, Sand or Rocky Subſtance below where the Plough goes; there indeed it is very ill Husbandry to go deeper, either with the *Plough* or *Spade*, to fetch up a hungry Soil worſe than the Surface. Reaſon and Foreſight therefore muſt always govern. But where the Soil is good eighteen or twenty Inches deep, there it is the Husbandman's Intereſt, and it ſhould be his Care, once in Twenty Years to *dig* his Tillage for all Sort of Grain; and I need not ſay how much ſtronger the Reaſon is, if he intends to ſow *Carrots* or *Parſnips* for his own Uſe, or the fatting of his Hogs.

Concerning

Concerning the ſeveral Sorts of Corn *or* Grain *generally ſown in* England, *viz.* Wheat, Barley, Rye, Oats, Beans *and* Peaſe, *&c. with the proper Methods for their Cultivation and Increaſe.*

Of Wheat.

I Begin with *Wheat*, as the King of Grains, and the Pride of the Farmers Harveſt, there being not any Grain in *Europe* more univerſally uſeful and neceſſary than *Wheat*; which is never more ſenſibly felt and underſtood, than when there proves a general Failure in the Crop.

There are obſerved in *England* to be ſeven or eight Sorts of Wheat. (1.) The Egg-ſhell Wheat, reckoned beſt for light Lands, and to be mixed with Rye for Maſlen; it being early ripe. (2.) The Double-eared Wheat, much ſown in *Eſſex*, and proſpers in a heavy Clay or a loamy Soil. (3.) The Red or *Kentiſh* Wheat, much ſown in *Hertfordſhire*, and is ſometimes found with Awns or Beards. (4.) The Great-bearded Wheat, which thrives well on a heavy Clay. (5.) The Pollard Wheat. (6.) The Grey Wheat. (7.) The Flaxen or *Lammas* Wheat. There are alſo many other Names given to ſome other Sorts; as the Ograve, the Chiltern, the Turkey, the Saracins: But it is uncertain, whether there be any other real Difference between many of the Sorts, but what the different Nature of the Soil and Climate affords. But however, this is certain, that all of them are good and uſeful, affording to Mankind great Relief and *Support*, well anſwering the general Character of being the *Staff* of Life.

Wheat grows in almoſt all Countries of the World, and loves a Soil that is rather dry than too moiſt; and yet rather ſtiff than too light; where it flouriſhes greatly if well and ſeaſonably cultivated. Neither a very rich, nor yet a very poor Soil, is beſt for Wheat in general; for the *laſt* yields but poor Corn, and the *firſt* will run all to Straw; as hath been ſufficiently experienced in the *Weſt Indies*, where ſome Straws have grown to the Heighth of a Spear or Pike: Wherefore the Husbandmen, both ancient and modern, are wont to eat down their too rank Corn in the Spring with Cattle, when young before it ears.

A mixture of Clay and Black Mould, commonly called Hazel-Mould or Brick-Earth, is the beſt and moſt agreeable. But yet the red *Lammas* or Bearded Wheat will do ſingularly well on the moſt ſtrong ſtiff Clay, or coldeſt Land; only the colder it is, it is ſo much the longer a ripening; which in cold wet Summers, and a far *Northern* or elevated Situation, is a Circumſtance that ought to be conſidered. All the Sorts of Wheat are commonly ſowed after a Summer's Fallow, when the Land has been ploughed and turned up to the Sun and Weather four times; though for Peaſe, Beans, and Oats, it is ſeldom ploughed more than once: The Reaſon whereof is, becauſe the Ground was ſo well prepared the Year before for Wheat, and the Nitre is not yet ſpent. But without doubt, if the Wheat-Stubble be ploughed in to rot or burnt, and after ſome time ploughed, the Husbandman would not loſe his Labour; for the Aſhes of the Straw will ſuck in the Nitre, and ſo will the Straw when rotted. And this I take to be the chief Uſe of all Dungs; which as they are more or leſs *receptive*, ſo they are better or worſe for Land.

Wheat is commonly ſown in Autumn, and better in a wet Seaſon than a very dry one; and it may be either earlier or later, as the Nature of the Land and the Situation of the Place require. It is ſown in various Sorts of Lands, and in different Methods; ſometimes in Incloſures, and more often in Open and Champion Fields: Only it hath by ſome been obſerved, that what is ſown in Incloſures or Lands ſheltered, is more ſubject to Mildew; which is attributed to the want of a free and open Air. But I am apt to think, there is not much Weight to be laid upon the Obſervation.

The Method of preparing Wheat for Sowing, I have already laid down. I am here only to take notice, that two Buſhels is the common *Quantum* for an Acre; though where the Land is very rich, *leſs* will do; and if it is very poor, ſomething *more* muſt be added. There is alſo ſome Conſideration to be had to the Nature of the Seed; which if it is ſmall will run further, but the larger Sorts fill the Hand with leſs in Number, and conſequently will not ſpread ſo far; which is the reaſon, that if the Land is not too ſtrong and heavy, the ſmalleſt Seed is choſen. The Seedsman here is to be put in mind, that he take great Care to ſow the Seed, not in Heaps and Patches, but in an even regular Manner; letting the Seed ſlip through his Fingers, and his right Hand to keep exact Pace with his left Foot.

Sometimes the Wheat is ſown immediately after Ploughing, and ſo harrowed in. But this Method hath been found not ſo well to ſecure the Corn in hard Winters, or to defend it from exceſſive Droughts in Summer, having not a ſufficient Depth of Earth. And therefore the Rule now moſt generally prevails, to ſow it before Ploughing, or as it is called *Under-Furrow*: not ſuffering the Harrow to come upon the Land, but leaving it rough and full of Clots not over-big, to ſecure the Wheat the better from exceſſive cold Winds and Froſt; ſtill remembering to keep open the Trenches to let out all ſtagnating Water, and to ſhovel up the Lands-Ends clean, where the Clots or Earth have been drawn over them by the Plough.

Sometimes Wheat has been ſown in the Spring with great Succeſs, where the Soil is warm, and when the Summers have proved favourable. And tho' it is commonly ſaid and thought, that Wheat ſown at that Time runs all to Straw; yet *that* is in a great meaſure a Miſtake, and only happens in very wet Summers, when the Ears do not fill, nor the Corn well ripen. I remember a Friend of mine in *Berkſhire* told me, That after the great Froſt in 1708 had killed all or moſt of his Wheat ſown in Autumn, he ploughed it up, and ſowed it again in *March*; which ſucceeded ſo well, and produced ſo great an Increaſe, that the Crop of Wheat, which ſold the following Winter for Ten Shillings and Twelve Shillings a Buſhel, would have purchaſed the Fee-Simple of the Land.

Setting of Wheat, either with Sticks or other Inſtruments contrived for more Expedition, hath always a *ſaving* Advantage attending it; for little more than a Gallon will ſerve for a whole Acre. And in a dear Year, when Wheat is Ten Shillings a Buſhel, it may be eaſily computed that the Farmer ſaves Seventeen Shillings and Six-pence in his Seed-Wheat for every Acre, which will doubly pay for the *ſetting* it, even in the ordinary Way, by Boys and Girls at Three-pence a Day. In Mr. *Everard*'s Computation, each Grain ſhould be ſown at ten Inches diſtance; becauſe, if the Land is in Heart, it will ſpread and tiller into many Stalks.

Mr. *Houghton* tells us of one Grain of Wheat that had eighty Ears, which contained above 4000 Grains; and computes, that an Acre of Ground, enriched with the niceſt Husbandry, *may* produce 26 Quarters of Wheat. But he doth not ſuppoſe that all Grounds will produce alike, neither had he Faith enough to expect to ſee ſo great and good Husbandry in any great Quantity. But he ſeemed ſatisfied that any Land may be greatly improved; and that if ſuch Things can be done in a little, the like, with the ſame Land and the ſame Management, may by parity of Reaſon be done at large.

It hath been reckoned very good Husbandry in ſome Places, to take a dry Seaſon in *March* to run over the Wheat-Land with a light Harrow and one Horſe, a little to break the Clots, and to nouriſh the Roots of the Corn with freſh Mould, and to cover what the Winds and Winter-Froſt may have left ſomething bare; by which means the Corn is obſerved to gather and ſpread the better, and will alſo be left in a Condition the better to admit the Scythe at the Seaſon of mowing the Stubble; which is the Practice of moſt Countries; *that* being reckoned better Covering than Straw, both for their Ricks of Corn and their Houſes.

The Time of weeding Wheat is *May*, or the Beginning of *June*, before it is eared; and though it happen to be never ſo full of Thiſtles, &c. yet you ſhould carefully weed them out with a Hook at any Charge; for *without* that Charge and Pains little can be expected, and *with* it you will be doubly repayed. There is as much Reaſon to be careful in not beginning to weed too ſoon, as in ſtaying too long: For an early Weeding oft-times requires a ſecond; and a late one, without great Care, doth much harm, by means of treading and bruiſing the Stalks.

Towards *Auguſt*, the Wheat ripening and changing Colour, it ſhould be carefully ſecured from Crows and Sparrows, the great Enemies and Devourers of it, eſpecially near Hedges. Before it is quite or perfectly ripe and hard, ſo as to ſhake out of the Ear, it ſhould be reaped; that Method being obſerved to make it of a finer Skin, and conſequently more marketable: And it will quickly harden in the Sheaf and Stouk; which ſhould generally be ſuffered to ſtand abroad Ten Days or a Fortnight. In which time, if moderate Rain ſhould come, it will only plump it, and two or three Days of dry Weather will mend it again. In many Places I have ſeen it practiſed with very good Reaſon and Advantage, *viz.* to make one or two Sheaves larger and longer than ordinary, which are dextrouſly applied to the Top of the Stouk, opening them in the middle, and letting the Ears hang downwards; by which means a great deal of Rain (if it ſhould happen) will be ſhot off, and the whole be kept dry.

After this, it is either carried into the Barn, and there laid with the Ears inward, or (which is much the better, the more improved, and modern Practice) it is laid on Stacks or large round Cocks out of Doors, to be defended with Thatch on the Top. This laſt Method, though variouſly practiſed in different Countries, yet is now by all univerſally agreed to be the beſt, both for keeping the Corn dry, and preſerving it from Vermin. The want of which Knowledge put our Forefathers upon erecting thoſe vaſt and coſtly Barns, now ſupported and repaired at great Charge, and are in many Places left as ſtately and empty Spectacles of the Indolence or Ignorance of former Ages.

However, the Cuſtom of Houſing the Corn in ſome Places ſtill remains. For in *Norfolk*, and the Counties adjacent, they take this following Method. After the Barn is well aired, and the Flour covered with clean Wheat-Straw or Bavins, in the middle of every Bay is placed an empty Hogſhead; and the But-ends of the Sheaves of Corn, whether Wheat or Barley, are laid round it; and if Oats, unſheafed Barley or Peaſe, they are trod cloſe to it, until the Corn reaches the Brim; and then the Hogshead is pulled up higher; and ſo on till the Barn is full, that juſt the Hogſhead may be got out, which leaves a *Well* behind it to the very Bottom, called a *Well-Mow:* into which the Moiſture and Sweat of the Corn gathers ſo much, that whilſt it is heating, no one can endure his Head over the Hole; and if a Mouſe fall into it, it will ſuffocate it. This Method (they ſay) preſerves the Corn tolerably well, eſpecially if they obſerve, after the Moiſture is gone, to make the Barn as cloſe as poſſible.

Where there are Barns already built and well repaired, this Practice may not be unadviſable. But without queſtion, where Choice may prevail, (one or two Bays at moſt being ſufficient for Thraſhing) ſetting the Corn abroad in a well-fenced Place, is much better than houſing it. Eſpecially if the ſtill more improved Practice were admitted, *viz.* to make a ſtrong framed Hovel ſet upon either Stone-Poſts with Caps, or wooden Poſts, lined about in the middle ſeven or eight Inches deep: For this not only effectually prevents Mice from coming at the Grain, but ſecures alſo the Bottom from being affected with the Damps of the Earth.

Wheat, the drier it is, the more it weighs: And a Buſhel of dry Wheat (if it be good and ſound) ſhould weigh from 60 to 64 Pounds. If it be any way damaged, mixt or corrupted, it will not weigh above 54 or 56 Pounds. So that the Goodneſs or Badneſs of Wheat may in great meaſure be diſcovered by its Weight, and conſequently its Value alſo. For tho' the Lightneſs of a Buſhel of Wheat may be owing to its being mixt with Oats, or other Seed lighter than it ſelf, and yet be good and dry; yet that Mixture *ſo* much diminiſhes the Quantity of good Wheat, and conſequently its Value.

Of BARLEY.

BARLEY is a moſt neceſſary and uſeful Grain, tho' too often made to miniſter to the worſt Purpoſe of *Intemperance.* For ſuch is the Profuſeneſs, ſuch the Ingratitude of the corrupt Part of Mankind, that what God gives as a Bleſſing to be uſed with Moderation, they too often prodigally waſte in Exceſs, to the Abuſe of Reaſon, and to the Violation of the Laws of God and Man.

There is not a great deal of Difference obſerved in this Grain. The moſt remarkable Sorts are four. 1. The *Long-eared*; moſt generally eſteemed for all Uſes, and all ſorts of Land. 2. The *Sprat* or *Fullum* Barley; which, for rank Land is beſt, becauſe it doth not run to Straw, as the common ſort, and is thought to yield ſomething better, tho' the Maltſters do not like it ſo well. 3. There is a *Hot-ſpur* or *Rath-ripe* Barley, uſually harveſted a Fortnight or Three Weeks before the other, and delights beſt in ſome Sorts of hot and light Land. This ſort of Barley hath been ſometimes ſown and returned to the Barn in two Months Time, and very often in nine or ten Weeks. It is much ſown in *Oxfordſhire*; but it is no Native of that Country, but fetch'd from *Patney* and other Parts of *Wiltſhire*; where the Soil is of ſo peculiar a Quality, that whatever other Barley is ſown there, yet (as the Countrymen obſerve) it moſt commonly turns into This. In the *Weſtern* Parts of *Cornwall* they ſow this Sort of Barley near the Sea, which they carry to the Mill in eight or nine Weeks after it is ſown. However, what comes to *Oxfordſhire*, comes all from *Patney*; but it is not ſo agreeable to the *Oxfordſhire* Soil, coming immediately from thence, as when it hath been ſown elſewhere twice or thrice: After which, it endures not above three or four Years, but degenerates again into common Barley.

Its Conveniency is very conſiderable in wet and backward Springs, ſucceeded by cold Summers, when many other Countries loſe their Seaſons, and ſome of the more *Northern* Ones perhaps their Crops, the common Barley never coming to be perfectly ripe. Whereas this may be ſown at the latter End of *May*, and will come to be ripe in the worſt of Summers; ſo that it is generally approved of by all ſorts of Husbandmen.

Only this Caution is always to go along with the Practice of ſowing it; that the Husbandman be not too haſty in ſowing it in the *Spring:* Becauſe as it ripens a Fortnight ſooner than the other Sorts ſown at the ſame Time, it will tempt the Sparrows and other Birds to lie wholly upon it, to the Hazard of being utterly devoured. I once obſerved two or three Ridges of this Barley ſown in a common Field, by Way of Trial, in *March*, with the other Sorts; and tho' the Crop proved excellent, the Whole was entirely deſtroy'd, the Birds being very eager (after great Hunger) of catching at the firſt Ripe Corn.

4. There is a fourth Sort, much different from the aforegoing: In the *Northern* Parts it is called *Big*, or *Scotch* Barley, having a ſquare Ear and four Rows of Corn, as the other Sorts have but two. The Practice of ſowing *Big* hath for many Years almoſt univerſally obtain'd in the Biſhoprick of *Durham*, *Northumberland*, and the more *Northern* Parts, for

want of better Knowledge. For, to ſay nothing of the general Diſlike and Diſtaſte which Strangers take to it made into Drink, on the Account of its purging raking Quality, even the ſame that Rye hath made into Bread; I cannot find that *Big* anſwers better to the Buſhel than a Crop of Barley. If it have more Grains in Number, yet that Advantage is more than counter-balanced by the Leanneſs of the Corn, and the Thickneſs of its Skin; ſo that the Malt made of it cannot be expected to give the ſame Strength to Drink, as the ſame Quantity of Barley made into Malt will.

There are two Advantages attending this Grain, which tempt Farmers to ſow, and others to buy and uſe it; which are theſe: That it is apt to ripen well and early; and hath alſo the ſame Quality when brew'd into Drink, that it is ſooneſt ready for Uſe: But if what hath been above ſaid be but well conſider'd, it will quickly grow into Diſuſe. And indeed, its Reputation of late is very much ſunk; eſpecially ſince upon Experience and good Management it is found, that the common Barley ripens very well moſt Summers, and yields as great an Increaſe. And yet, if there were any danger from wet and cold Summers, the Rath-ripe Barley better anſwers that Objection, and is more acceptable to the Maltſter.

Barley is generally, and for the moſt part, ſown after a Summer's Fallowing, expecting the ſame Dreſſing of Land that Wheat doth: But being a tenderer Grain, and more impatient of ſevere Cold and Froſt, the Seed-time for Barley is in the Spring, earlier or later according to the Nature of the Seed and Soil, and the Temper of the Seaſon, allowing four Buſhels to the Acre. Late Sowing is accounted beſt for a light Soil, which is apt to run to Weeds. But the general Rule for ſowing Barley is to do it whenever the Land is dry and fit for ſowing, be it never ſo early, when *January* is once over; for it is not a little Froſt that will hurt it. I have known Barley ſown the Beginning of *February*, and after it appeared above-ground, there came on three or four Days hard Froſts, ſuch as would bear a Cart to go over it without making Impreſſion, and yet was unhurt, and the Crop proved exceeding good.

There are many different Ways of diſpoſing the Land for Barley: Some lay the Land up in ſmall Ridges all the Winter, that it may lie the drier, and the better receive the Influence of the Weather. Then in *March* they ſplit the Ridges, and if they are full of Clots, harrow them; and after that, either ſow it under Furrow, or above; for both Ways have been practiſed with Succeſs. But which Way ſoever it be done, ploughing and ſowing ſhould be done both in one Day, for the Reaſon already aſſigned; that all Seed delights to be thrown into freſh Mould. Some make this laſt ploughing of the Land for Seed to be athwart, or croſs the ſmall Ridges, which is thought to mix the Soil much better; and then they harrow in the Seed, leaving the Whole *flat*; which is the Method for dry Soils and late Sowing.

If Barley be ſown after Wheat, (which is called an *Etch Crop*, and is practiſed in many Places with great Succeſs;) as ſoon as the Time of ſowing Wheat is over, plough up your Wheat-Stubble in as dry a Time as poſſible, and lay three Ridges to one, if you have Dung to lay on it; if not, plough it in ſmall Ridges as before directed, becauſe the Land will lie the drier, and the Froſt will mellow it the better. Or if there happen an early Harveſt and dry Weather, and that your Time will allow of it, it will be ſtill a greater Improvement, if you plough the Land before you ſow the Wheat, juſt as Harveſt is in. This will make it half as good as a Summer-Fallow. But all Years will not favour the doing it this Way.

Great Care muſt be taken to *weed* Barley; no Grain ſuffering ſo much as that by Thiſtles, Docks, *&c.* The Time of doing it is in *June*; and if then it appears to be a thin Crop, either thro' too much Wet, want of Seed, or any other Accident, it is very adviſable to ſtrew Pidgeon's Dung or Malt-Duſt over it, by which Means it will ſtrangely increaſe and gather; but this Work is moſt properly done in rainy Weather.

The Husbandmen commonly account their Barley ripe, as they do their Wheat, when it hangs its Head, and the Straw hath loſt its Verdure. If it remain full of Weeds till it is *mow'd*, (as the *South* Country Faſhion is) it muſt lie on the Swarth till the Weeds are well wither'd and dry'd; otherwiſe it will be apt to be muſty, and loſe its Uſe for Malt. But indeed the lazy and ſlovenly Cuſtom of the *South* in mowing down their Barley with a Scythe, is by no means to be imitated or encourag'd, having many Inconveniencies attending it; as it ſubjects the Corn to great Waſte in gathering it together, as well as great Trouble in loading and unloading it, eſpecially in windy Weather. Herein therefore the neat and frugal Method of the Farmers in the *North* is highly to be commended, never ſuffering the Scythe to be uſed amongſt any ſorts of White Corn; but conſtantly *reap* all, as they do their Wheat, ſetting it up in Shocks till it is dry and fit to carry; which is then done, as every one may know, with great Eaſe and Expedition. The Women and Children are bred up to this Work, and ſix of them will reap an Acre of Barley or Oats in a Day; and the Charge of this is more than over-balanc'd by what is ſaved, and the Expedition in carrying it.

Dr. *Plot*, in his *Hiſtory of Staffordſhire*, tells us of a *Naked Barley* or Wheat-Barley, which, tho' its Ear is ſhaped like other Grain of this Kind, is yet like Wheat, without any Husk. At *Rowley* it is called *French Barley*, being like what is ſold under that Name: It is a Plant between Wheat and Barley in Goodneſs as well as Form; accordingly it is ſown to be uſed for Bread inſtead of Wheat in a Time of Scarcity: However, it alſo runs to Malt as well as other Barley, and makes a good ſort of Drink; and likewiſe increaſes in ſome Soils twenty Fold.

It need not be ſaid how very uſeful a Plant Barley is become here in *England* both to King and Subject; for of it is made *Malt*, which pays one of the moſt conſiderable Duties to the Crown, beſides the Exciſe on Beer, Ale, *&c.* all which together make a vaſt Branch of the Royal Revenue.

As to the phyſical Uſes of both Wheat and Barley, it may be obſerved, that from Wheat itſelf Medicines are made againſt Tetters: For being laid on an Anvil, and upon it a hot Plate of Braſs or Iron, a Liquor will run from it, which you are to lay hot on the Tetter. It alſo makes ſmooth any Roughneſs of the Skin, is good againſt Ulcers of the Boſom; and the Bran preſſed from the Water, apply'd hot, and often repeated, eaſes the Pains of the Pleuriſy.

And as to Barley, the Meal of it made into a Pultis with Camomile Flowers and red Roſe Leaves, applied warm to any pained Limb, gives Relief. Barley is a great Cooler, and *Water* made of it is often drank; prepared any way it never heats the Body, and it is good in many phyſical Caſes.

Of

Of RYE.

RYE is a Grain generally known, and delights in a dry warm Land, though it be not over-rich; though indeed it will grow in moſt Sorts of Land, provided it be looſe and well tempered, for it doth not require either the Richneſs or Labour that Wheat doth; though it ought to be ſown in Autumn after a Summer's Fallow, about the latter End of *Auguſt*, or the Beginning of *September*; ſtill watching for a dry Time, for Rain ſoon drowns it. It is of very quick Growth; ſoon up after it is ſown, ſooner in the Ear, and ſooner ripe than any other Grain; which Property often tempts the Farmer, in ſuch hard Winters as prove fatal to Wheat, to ſow it in the Spring, which many times turns to very good Account.

Two Buſhels of Seed are commonly allowed to an Acre. If the natural Soil be a barren Sand or Gravel, (which yet with good Husbandry and every other Year's Fallowing will do) it is beſt to ſow it alone; but if it have any degree of Mixture with heavier Land, it is beſt to mix Wheat and Rye together; only the Wheat ought to be ſown under Furrow, and the Rye above, and ſo harrowed in. It flowers long; and five Weeks after the Flowers are gone it will be ripe. The Ears, when it flowers, will be upright; but a proper Shower carries away the Redneſs; and ſo being pregnant with Seed, it then hangs down its Head. When the Straw is turned yellow, and the Corn becomes hard, it is full ripe. And though it is not apt to ſhed, yet if it is weedy, it ought to lye on the Gavel after it is cut, ſome time before it is bound up into Sheaves; otherwiſe it will be apt to *give* in the Barn, which will cauſe it not to thraſh well and to be muſty.

However, as it is a Grain that will grow in the Ear the ſooneſt of any, it muſt be carefully watched and defended (as above in the Chapter of *Wheat*) from too much Wet; and you ought to take the firſt Opportunity (after it is dry) to carry it home, and put it out of danger.

There is a Practice much to be commended and encouraged; for in ſome Places they ſplit the Ridges of the Wheat-Stubble, and ſow it with Rye, in order to gain Food for Sheep, in a Time when they moſt want it, *viz.* in *March* and *April*, allowing a Buſhel to an Acre; which they harrow in, and feed when proper till *May*, whereby the Land will be well folded and dunged, ſo as to be fit for a Summer's Fallow. But theſe Methods cannot be practiſed in common Fields.

Rye is eſteemed by many the beſt Bread-Corn next Wheat; only the Bread made of it is black and heavy; and the Sweetneſs that attends it pleaſes ſome, and diſpleaſes others: But its beſt Quality is, that mixt with Wheat in the hot and dry Weather, it keeps the Bread *moiſt*. But thoſe who are not uſed to it, complain they are frequently griped and purged by it.

In plentiful Years, inſtead of Peaſe and Beans, it is given to Hogs with great Profit; for after it is ground, and made into a ſtiff Paſte, the Hog will eagerly feed upon it, and will be fat in a ſhort Time, not cloying him with too much at once, and never letting him want Water. Only it is always to be remembered, that one or two

Buſhels of Beans or Peaſe ſhould be given him at laſt to harden his Fat.

It is thought an excellent way, to keep this Corn good and ſweet, to let it lye on a dry Flour with the Chaff after it is thraſhed; for that Moiſture, which would otherwiſe go into the Corn, is imbibed into the drier Chaff; which, in a proper Seaſon, ſoon becomes dry again, or the Grain may be ſeparated from it as occaſion ſerves, and ſo becomes always fit for the Mill.

The Price of this Grain uſually keeps equal pace at Market with that of Barley; and Wheat is moſt commonly double its Value. In many of the Inland Countries, it is carried mixt with Wheat, as it grows, to the Market; and according to the proportion of Wheat, it is of more or leſs Value. And this is commonly called *Maſlen.*

Of OATS.

OATS, of which there are divers Sorts, (as the *White*, the *Black*, the *Poland*) grow in all Countries, as well hot as cold, and are of as general Uſe and Eſteem. They are ſown with us in *England* in *February* and *March*; commonly upon an Etch Crop. Some think, that the Black Oat being much more hardy than the White, will well ſurvive the Winter, if not over ſevere, and by that means yield a vaſt Increaſe. But I cannot find, that the Husbandman is often willing to run the Hazard. *Black Oats* delight moſt in Moraſs and Fenny Ground; as alſo rather on cold moiſt Land than on dry; and may be ſown ſooner in the Spring than the White, becauſe they are hardier and will bear Wet better.

However, the *White Oat*, being better for moſt Uſes, and more ſuitable to the generality of Soils, is moſt ſown and ſought for; eſpecially the large White *Poland* Oat; ſo called, for that it was firſt brought from *Poland*, and is ſtill continued to be brought from thence occaſionally: foraſmuch as it is very apt to degenerate and grow lank, after four or five times ſowing. The Corn is very large, and plump almoſt as Barley, and is therefore much coveted to make Oatmeal, ſo very uſeful to the many Purpoſes of Life. This Oat yields great Increaſe on good Land new broken up; and I have known Ten Quarters Product from four Buſhels ſown on an Acre. There is ſome difficulty with them in a wet Harveſt, being very apt to *ſhed* after much Rain, when they are full ripe. But yet it is a precious Grain, and very much ſought after of late Years. Beſides this,

The ſmaller Sort of White Oat is very profitable, and will grow very plentifully on ſuch Lands, where, by reaſon of the Cold, no other Grain will thrive. In ſhort, there is no Ground too rich nor too poor, too hot nor too cold, for them: And beſide, they ſpeed better than other Grain in Harveſt, the Straw and Husk being of ſo dry a Nature, that though they are houſed wet, provided they be free from Weeds, they will not heat in the Mow, nor become mouldy, as other Grain uſually doth.

All Sorts of Oats, though (as hath been ſaid) they will grow almoſt any where, yet give the beſt Increaſe from new broken up Ground for three or four Years, according to the Strength of the Land. For want of this Knowledge, I obſerve many Places in the Biſhoprick of *Durham*, where they plough up the green Sward which they intend for Oats, and ſo continue a whole Summer's Fallowing; loſing the Advantage of the Land for the firſt Year, under a falſe Notion that little or nothing will grow on the firſt Turf..

But this I apprehend to be chiefly owing to the want of knowing the Uſe of a Roll. Without the Benefit of which indeed, the Hollowneſs of the Soil in a dry Summer will ſubject the Crop to the hazard of coming to nothing: But with the Advantage of a Roll eight Foot long, and twenty Inches diameter, drawn by one Horſe, ſoon after the Oats peep above Ground, it is commonly found the firſt and ſecond Crop are the beſt. Accordingly I hope to ſee my Countrymen grow rich, by deſtroying the whole Train of *Furzes* or *Whins*, the Diſgrace of every Farm, and improving the Land by the aforeſaid good Husbandry. But for the entire deſtruction of ſuch Weeds and Trumpery, I refer them to a proper Place.

The Quantity of Seed to the Acre, is to be proportioned to the Strength and Goodneſs of the Soil. Four Buſhels is ſufficient where the Land is very rich and mellow, that the Seed can be all buried; otherwiſe if the Land is pooriſh, ſix or ſeven Buſhels will be expected. And as ſoon as *February* ſets in, I think the Husbandman ſhould get to work, provided the Land be in order, and the Seaſon favour. I need not ſay, if the Land is new broke up, the Ploughing ſhould be over before *February*, that it may receive the Benefit of Froſt, in order to gain Mould to cover the Seed. But be ſure let him not forget the Roll when the Corn begins to look green. It cannot be repeated too often, that a Change of Seed is very neceſſary, though the Farmer is too often forgetful of what he knows to be right. However, this is a Grain that is alſo taken great Care of in the *North*, as it ought, being bound up in Sheaves, as Wheat in Harveſt.

In *Staffordſhire*, and ſo on to the moſt *Northern* Parts, is a ſort of red or naked Oats, that are much made uſe of for Oatmeal, becauſe the Kernel thraſhes out of the Hull, without carrying it to the Mill or drying of it: But it is by no means ſo good as the White Oat duly ordered.

In *Wales*, moſt of the Bread the ordinary People eat is made of Oats. And when Corn has been dear, in ſeveral Places about *London*, the Poor have made their Bread with three parts Oatmeal and one part Barley. And indeed, at ſuch a Time Oats are the chief Suſtenance of the Poor throughout the Kingdom. The *Scots* uſe Oats in a great degree in their Wars; for with a Bag of Oatmeal and a Kettle, they'll ſuſtain themſelves a great while. And indeed, it is a fit Corn for that Country; inaſmuch as Oats may be ſown and mowed while the Sun is hot, whilſt harder Corn requires longer Time, and a kinder Climate.

Oats are the beſt and wholeſomeſt Grain for Horſes, eſpecially if kept ſome time; for before they have had a Sweat in the Mow, or be otherwiſe thoroughly dry, they are too laxative. A ſmall pleaſant Ale is wont to be made of Oats made into Malt; of which, it is ſaid, King

William was a great Admirer. *Water-Gruel* is alſo made of Oats; and *Flummery*, with beaten Oatmeal ſteep'd in Water, and boiled to a Jelly; and in *Northumberland*, they are ſtrangely fond of what they call *Crowdy*, which is Oatmeal mixt with the Broth and Scum of the Pot, like Haſty-Pudding. But, *de Guſtibus non eſt diſputandum.*

Of BEANS, PEASE, *&c.*

THere are not many Sorts of *Beans* uſually ſown in Fields; for 'tis only the ſmall Horſe-Bean that is commonly propagated by the Plough. They will not thrive in light dry Ground, but delight chiefly in a ſtiff ſtrong moiſt Clay. But the beſt Method for their Propagation and Increaſe, hath not been well and thoroughly underſtood till of late Years. Becauſe as they love moſt to grow in Clay, it has been generally thought, that if they be laid deep into the Ground, they would be buried, and never riſe again; whereas Experience ſhews, that a Bean cannot well be buried too deep, provided the Soil be kept looſe at the Top.

I remember, it was the Practice of my Pariſhioners at *Telvertoft* in *Northamptonſhire*, for ſeveral Years that I lived amongſt them, to plough their Land in the Spring three or four Weeks ſometimes, before they ſowed their Beans, and after that ſowed them and harrowed them in. The Effect of which was, that not one Year in five they had a tolerable Crop, and ſometimes not their Seed again: Either from a Waſte of the Seed by the Fowls, that pick'd up all which happened not to lie deep; or if the Seed did grow, it lay ſo ſhallow, that at *Midſummer*, when they were in Bloſſom, *for want of Depth of Earth they withered away.* So laying hold of this Scripture-Expreſſion, I ventured to argue with them on a better Authority than I otherwiſe durſt, and attempted to perſuade them (for my own Sake as well as theirs) to try a new Method, to ſow the Beans *under-furrow*, ploughing them in with as thin a *Calf* as poſſible. Truly it was difficult to perſuade them to believe the Parſon knew that Matter better than themſelves.

However, I led the Way my ſelf, and perſuaded ſome few others to try in ſmall Quantities to ſow and plough very early, even the latter End of *January* and the Beginning of *February*. And the Succeſs we had that Year, ſoon perſuaded more to follow the next; till at laſt, before I left them, I think there was hardly one Land of Beans harrowed in; and the whole Field one Year was ſowed *under-furrow* before the End of *February*.

I have been the more particular in relating this, becauſe I think there is a Streſs to be laid upon the Juſtneſs of the Practice. And yet I ſhould have ſaid, that the Soil there is as rank and ſtiff a Clay as can poſſibly be met with. For after the Method became familiar and well underſtood, the Difficulty of letting out the Priſoners, the *Seed*, thro' the ſtiff Clay, was ſoon overcome, by harrowing the Surface after a Shower, as the Beans began to peep. It may now eaſily be perceived that this Practice not only ſecures all or moſt of the Seeds from the Fowls, but gives Depth of Earth, when they moſt want it, at *Midſummer*.

In ſhort, neither Beans nor Peaſe ſhould be any other way ſown but *under-furrow*, let the Land be what it will; for if ſtrong and ſtiff Land will be made tractable, the Argument will hold much better in a mixt Soil; and as for Peaſe, they are generally ſown in lighter Ground, and there there can be no danger of being buried. It ought however to be remarked, that there is a good deal of Care and Art to be uſed by the Ploughman; that he take heed not to go too deep, and to lay his Calf or Turf not edgeways, but *flat*, that the Beans may be covered cloſe with Mould; for otherwiſe, if the Beans lie in a hollow Place they will grow and ſpend themſelves with vain Endeavours to get thro', but cannot penetrate for want of ſome Hold and Entrance to direct their Motion.

There is no Grain that requires more Skill in the Management of its Propagation, nor turns to greater Profit to the Husbandman, than the *Bean*. Some think it rather enriches than weakens the Land, altho' it throws out great Productions; however, it doth leſs Harm than the white Corn, and tends to mellow and lighten the Land, and lays it up dry in Ridges fit for the next Summer-Fallow.

The common Quantity of Seed for an Acre is Three Buſhels, and the uſual Product is Twenty: However, if the *Berkſhire* Way were but followed and practiſed, much leſs Seed would do, and a better Increaſe might be expected; for there they think it worth their while to *Set* the Beans in Rows croſs the Ridges with Sticks and Lines about half a Yard aſunder, by which means they can go between the Rows with a Hough in *June* to deſtroy the Weeds; and at the ſame time to hill up the Beans with freſh Mould, which ſeaſonably defends them from the Drought, which is their dangerous Enemy. The Charge of this is thought to be doubly repaid in the Seed which is ſaved, (one Buſhel in this way ſowing an Acre) and in the Goodneſs of the Crop. Sometimes they ſatisfy themſelves to make Furrows with a Hough in ſtrait Lines and at equal Diſtances, which is ſomething more expeditious (like the Way of ſowing Garden-Beans) and anſwers very well. I tried this Method myſelf at *Yelvertoft*, and ſucceeded pretty well: But that being ſuch very ſtrong Land, the very *Treading* at the time of *Setting* the Beans ſo harden'd the Land, that when the dry Weather came on, there ſoon appeared great Chaſms and Cracks, which let in the Drought and did ſome Harm; but in any ſort of mixt Soil, I never ſaw any Inconvenience that Way, and the Crop very ſeldom failed.

There is no Grain yields a greater Increaſe than this, if it is rightly cultivated: But for this purpoſe, as a Change of Seed is in all Caſes proper and adviſable, ſo here it is extremely *neceſſary*; having by long Experience obſerved, that a Change from a lighter Soil to a ſtronger, and from a ſtrong to a lighter, always has an extraordinary Effect, and the contrary Neglect is manifeſtly rewarded with Loſs.

But to ſhew the prolifick Nature and Virtue of the Earth rightly cultivated and improved, and what Increaſe may be expected from her Bounty, the following Account and Relation from a Friend of mine in *Berkſhire* may be depended upon for Truth. From one ſingle Horſe-Bean, producing only one ſingle Stalk, Ninety Six Pods or Kids, containing in all Two Hundred Thirty Two Beans. The next Years Product from thence, carefully ſet and ſeparated from all others, was Three Gallons of Beans: Which Three Gallons the next Year afforded no leſs than Seven Buſhels and a half. From thence, the following Year there was an Increaſe of Seventeen Quarters and Two Buſhels of clean Beans, beſides what is called Offal and Waſte; all within the Compaſs of Four Years from one ſingle Bean.

Some think it proper to ſow *Peaſe* amongſt the *Beans*, becauſe the latter uphold the former: And the Method might be proper enough, were it not that poor People are greedy in ſtealing and gathering the Green Peaſe, whereby more hurt is done by their Feet than their Hands; ſo that I have always found it moſt adviſable to ſow clean Beans where the Land is any thing ſtrong, and to reſerve the Peaſe for the lighter Soils by themſelves.

There are different ways of gathering and harveſting Beans when ripe. Some get Bottles of the Peaſe-Straw, from whence they make Bands and tie them up in Bundles, ſetting them endways one againſt another to dry. Others content themſelves to mow them down, letting them lie to wither a Week or Ten Days, and then put them into little Cocks till they are ready for the Cart.

Peaſe are of ſeveral ſorts, *Green*, *White* and *Grey*. But all of them require a lighter Soil than Beans: Only the common *Grey Field-Pea* will do rather beſt in a ſtiffiſh Soil. The common *White Pea* loves a mellow Soil, and will yield great Increaſe, if ſuffered to grow to be ripe. But however it is, the Poor and common People are very apt to think their Right takes place before the Owner, and they take Poſſeſſion accordingly; which diſcourages many Farmers from beſtowing Charge and Labour on them.

But the *Blue Pea* of all others yields the greateſt Increaſe, and is uſeful for moſt Purpoſes both green and ripe. It is ſomething tender and impatient of a Froſt, therefore it is not adviſable to ſow them till the Middle of *April*. All the ſeveral Sorts, if ſowed without Beans by themſelves, are commonly reaped ſometimes with two Hooks, and ſometimes with one tied to the End of a Stick, letting them lie in ſmall Heaps as they are reap'd, till they find they hawm and the Cod dry. Only they ſhould be turned and raiſed from the Ground as much and as oft as poſſible, that lying hollow the Wind may dry them, eſpecially after Rain. The common Allowance of Seed is two Buſhels to an Acre.

If the Land wants to be enriched, there is no better, cheaper and more cettain Method of doing it, than by ploughing in any of the ſeveral ſorts of Peaſe at *Midſummer*, juſt as they are in full Bloſſom. Their Juice and Vigour at that Time afford an uncommon Fertility to the Land, and admirably diſpoſe it for Wheat afterwards; which ſhould naturally lead the Farmer to ſow Peaſe upon his Fallows in Spring. But I ſhall have occaſion to repeat this Advice preſently.

Vetches or *Fetches*, by ſome called alſo *Chick-Peaſe*, are a very uſeful Grain for Horſes, Hogs, or Poultry, and will grow upon almoſt any Soil that is not over ſtrong and heavy. There are ſeveral ſorts of them, *Red*, *Black* and *White*; but the moſt remarkable Difference is found in two of the Sorts called the *Winter* and the *Summer Vetch*: The one abiding the Extremity of the Winter, and the other not to be ſown till the Spring. Both ſorts are reckon'd to be great Improvers of Land, eſpecially if uſed the two following Ways. (1.) Either by eating them on the Ground with Horſes at *Midſummer*; confining the Horſes by ſhort Ropes to ſmall Quantities at a time, that they may not be ſurfeited with too much of this hot and ſtrong Food at once, and that the Land may be manured by the Dung. Or (2) by ploughing them in, (as before directed for Peaſe) at the Time of their Blooming about *Midſummer*, as the Seaſon will permit. The Succeſs which I have known from this Practice is almoſt incredible; and I have from Obſervation found no Difficulty to believe, that Land thus managed once in Three or Four Years will eaſily regain its own Strength with little other Manure or Help, except proper and ſeaſonable Tillage.

Lentils and *Tares* are alſo ſown in many Places, where the Soil is but weak; becauſe in *better*, they would run too much to Straw and rot on the Ground. A Buſhel will ſow an Acre, and the Increaſe is great; the Straw, if got well and dry, is as good as Hay for Cows and Horſes. But eaten together as they grew, they give great Proof to Cattle, eſpecially thoſe that are young. Theſe ſmall Seeds are mightily admired by Pidgeons, becauſe they are a hot Food: And indeed they ſhould never be wanted where there is a Dove-houſe. They need but one ploughing, and want little other Manure, but *ploughing in* of the laſt Stubble; becauſe, like the aforemention'd Pulſes, they *enrich* the Land themſelves. Some, who dare not truſt Peaſe with the common People's Honeſty, ſow theſe ſmall Pulſes with their Beans, harrowing them in at the Top, after the other are ſown under-furrow; which may be a very good Way, becauſe they are eaſily parted with a Riddle.

Of CORN-GRANARIES.

IT is no ſmall Advantage to the Publick, to the Husbandman, and to the Poor, to ſupply the Wants and Defects of ſcarce Years, by laying up and preſerving of all ſorts of Grain when it is cheap and good. For in a Time of Dearth and Scarcity, the Farmer hath little to ſell to advance his Stock, or to pay his Rent; and the Buyers are often furniſhed with bad Corn from Foreign Parts, or from ſuch as were ignorant of the Ways of preſerving it. Therefore the Farmer had need be provident, and look about him to guard againſt Want; and in ſome of the Years of moſt Plenty, to make uſe of ſome of the following Ways of making of *Corn-Granaries* for ſtoring it up; led to it by theſe two forcible Reaſons: That in *dry* Years, when it is always beſt for keeping, he is ſure to buy *cheap*; and in *wet* ones, when keeping it is dangerous, he may be almoſt certain to ſell *dear*.

I have already taken Notice of ſome of the beſt Methods for preſerving Corn abroad in Stacks or Hovels ſet upon Stone or Wooden Poſts with Caps over them, to prevent Mice getting into them: And by this means I have my ſelf preſerved conſiderable Quantities of Wheat unthreſhed for Three or Four Years together; and have ſo far experienced the Advantage of it, that at the End of that Term I ſold ſome for Eight Shillings, ſome for Nine, and ſome for Ten Shillings the Buſhel; and yet I ſold Wheat of the ſame Years Growth, when I firſt laid it up, for Two Shillings the Buſhel, and equally good.

But becauſe there is an unavoidable Inconvenience attends this Method of keeping Grain in the Straw; that the Farmer will want his Straw and Chaff for his Cattel to make Dung with: Therefore ſeveral Ways have been invented to preſerve Corn after it is threſhed, and likewiſe after it is cleaned and well dreſs'd. To keep it in the Chaff before it is winnowed is leaſt difficult, and therefore often practiſed by thoſe who have not better Conveniencies, contenting themſelves to lay it in Chambers or Lofts, and ſo *dreſs* it as they want it. Others, to remove the Temptation of uſing it before dear Years come, threſh out the greateſt Part of their Stock in *March*, leaving only one Hovel wherein to ſtore the whole threſhed Corn with the Chaff; laying it a Foot thick in five or ſix Layers, and betwixt each Layer diſpoſe two Rows of Sheaves; and after this ſecure the Whole by good and ſufficient Thatch. In this way it will keep many Years ſound and good, if it be guarded from Accidents.

But becauſe it may be thought there is ſome Danger, as well as Trouble, in this Method; moſt of the Farmers in *Berkſhire*, and ſome of the neighbouring Counties, who have every Year near One Hundred Quarters of Wheat, and double the Quantity of Oats, think it worth their while, once for all, to build a Corn-Granary for that and *only that* Purpoſe, with Diviſions in it for ſeveral Grains. Some are made with Chambers one over another, that the Corn may be let gradually thro' a little Hole from one Chamber to another till it comes to the Bottom, and then is carried up again as Neceſſity requires. Others make a ſingle long Room made with Stone or Brick well laid in Lime, and plaiſtered within with a thick Coat of Lime, Hair, and beaten Glaſs, or the Duſt from the Smith's Anvil: Theſe, well incorporated and harden'd, hinders the Mice and Rats from penetrating. And once in two or three Weeks they throw the Corn from one End of the Room to the other, keeping Windows open ſometimes to the *North* and *Eaſt*; but by no means ſuffering the *South* Air to come in. But ſtill as theſe are ſubject to great Damps and Sweatings, and becauſe it is almoſt impoſſible to be ſecure in this Way from the Danger and Damage of Rats and Mice,

The lateſt, beſt, and now moſt approved Practice, in thoſe Countries where they have the greateſt Quantities, and from whence there are greateſt Demands by means of navigable Rivers, is to build their Granaries on Stone-Poſts about two Foot high from the Ground, with Caps, (as before directed for making Hovels for Corn) multiplying the Poſts according to the Length and Bigneſs of the Building deſired. Some are built with Brick and Timber together; others only with Timber and Boards; as judging ſuch will be leaſt ſubject to Dampneſs and Moiſture, and, which is ſtill a greater Advantage, will admit the Air and Wind thro' the Crevices of the Wood and Boards, better than if it was entirely cloſed with Brick-Work.

Such ſort of Buildings as theſe ſet upon Stone-Poſts, are found to be extremely beneficial and uſeful, and may eaſily be made to contain two or three hundred Quarters of Grain, with Room enough alſo to keep the Corn ſeaſonably removed and ſtirred: And they are effectually ſecured from Mice, provided Care be taken not to lay any thing *under*, nor ſet any thing *againſt* the Building, that may give them a Paſſage: And accordingly the Stairs, by which Servants go up and down, are made moveable, and ſhould be moved as Occaſion ſerves.

All Places ſet apart for the keeping of Grain ſhould be as free from Moiſture and Dampneſs as poſſible, and as far from Stables of Horſes Oxen or Swine as may be; inaſmuch as all ſtrong Smells attract Moiſture, and give a muſty Taſte to Grain. Some preſcribe the having the

Walls and Floors to be waſhed with Vinegar, or a Decoction of bitter Herbs and Drugs; as, Leaves of Wormwood, Southernwood, Wild Cucumbers, the Pulp or Seeds of Coloquintida, Beaſt-Galls, *&c.* And doubtleſs, no Worms, Vermin or Weevels can bite or touch the Corn where theſe are uſed. But they who will not be at this Pains, may lay ſome Wormwood well dried underneath, above and upon their Corn-Heaps; or elſe let them anoint their Walls and Floors with Oil-Olive or Sheep's Urine. To powder the Floor under the Corn with green Oak-Aſhes, is the preſent killing of all Mites. And to keep Grain from heating or chaffing, beſides the afore-mention'd Removings, let there be laid under every ten Buſhels of Corn one Buſhel of Millet; or if it be mingled therewith, it is eaſily ſeparated with a Sieve. But if it happen, that by the Moiſture of the Weather, or Neglect of turning, any Grain prove muſty, ſpread it thin on a Cloth, and let it lie out all Night in the Dew; and after it is dry'd well next Day in the Sun, it will return to its Sweetneſs.

But becauſe there are ſeveral other Things, beſides the aforegoing ſorts of Corn and Grain, made uſe of and ſown in the Way of Husbandry, and propagated in the Fields by the Plough; to make this Work as compleat and as generally uſeful as may be, I ſhall not forget to take Notice of them in this Place, and to explain their Nature, and the Method of Cultivation.

Of HEMP *and* FLAX.

HEMP muſt be ſown in fat and well-dunged Grounds, and watered with ſome little Brook; or elſe in fat and moiſt Places, where much Labour and Ploughing hath been beſtowed; for the fatter the Ground is, the thicker will the Bark or Pilling be. It muſt be ſown in *March* or *April*, and gather'd when the Seed is ripe, and afterwards dried in the Sun, Wind or Smoak; and then laid in ſome Water to be watered, that ſo the Pilling may more eaſily depart from the Stalks, afterwards to be uſed in making of Ropes and Cloth.

Mr. *Worlidge*, in his *Syſtema Agriculturæ*, ſays, Hemp delights in the beſt Land, warm and ſandy, or a little gravelly, ſo it be rich and of a deep Soil: Cold Clay, wet and mooriſh, is not good; the beſt Seed is the brighteſt, that which will retain its Colour and Subſtance in rubbing; three Buſhels will ſow an Acre, but the richer the Land, the thicker it muſt be ſown. From the Beginning to the End of *April* is the Time of ſowing; according as the Spring falls out, earlier or later. It muſt be carefully preſerv'd from Birds, which will otherwiſe deſtroy many of the Seeds; for which Purpoſe ſome ſcatter a thin Covering of light Straw.

The Seaſon for gathering of Hemp is firſt about *Lammas*, when a good Part of it will be ripe; that is, the lighter Summer Hemp that bears no Seed, and is called the Timble Hemp, and the Stalk grows white; and when it is ripe, it is moſt eaſily diſcernible; which is about that Seaſon to be pulled forth and dried and laid up for Uſe. You muſt be cautious of breaking what you leave, leſt you ſpoil it: You are to let the other grow till the Seed be ripe, which will be about *Michaelmas*, or before; and this is uſually called the Karle Hemp. When you have gathered and and bound it in Bundles, of a Yard Compaſs, you muſt ſtack it up, or houſe it, till you threſh out the Seed. An Acre of Hemp may be worth unwrought from 5 l. to 8 l. if wrought, 10 l. 12 l. or more. It is a great Succour to the Poor; the Hemp-Harveſt coming after other Harveſts, and in the Winter-Seaſon, it affords Employment to ſuch as are not capable of better.

Another Author gives ſtill a more particular Account of Hemp, and ſays, the fitteſt Soil for it is a rich mingled Earth of Clay and Sand, or Clay and Gravel well tempered; and the beſt ſerves beſt for the Purpoſe, for the ſimple Clay or Sand are nothing ſo good: This beſt is called Red Hazel Ground, being well ordered and manured; and of this, a principal Place to ſow Hemp on, is in old Stack-Yards, or Places wherein Winter Sheep and Cattle are wont to lie. Some will preſerve the Ends of Corn-Lands which butt upon Graſs, to ſow Hemp or Flax on.

Now for the Tillage or ordering of the Ground, it muſt be at leaſt thrice broke up, except it be ſome very mellow and light Mould, as Stack-Yards, and uſual Hemp-Yards be; and there *twice* is ſufficient, *viz.* about the latter End of *February*, and in *April*, when you may ſow it reaſonably thick with ſound and perfect Seed: You muſt lay it ſhallow in the Earth, and cover it cloſe and light, and with ſo fine a Mould as you can poſſibly break with your Harrows or clotting Beetles; and till it appears above-ground, you muſt carefully defend it, eſpecially an Hour or two before the Sun riſes and ſets, from Birds and Vermin.

You need not weed it; for it is ſwift of Growth, rough and venomous to any thing that grows under it. When ripe, it muſt be pulled up by the Roots; and the Time is, when the Leaves fall downward, or turn yellow on the Tops; and this for the moſt part will be in *July*, if it be for Cloth: But for Seed, you muſt let the principal Buns ſtand till the latter End of *Auguſt*, and ſometimes to *Mid-September*; and then the Seed being turned brown and hard, you may gather it; for if it ſtand longer, it will ſhed ſuddenly.

As ſoon as you have pulled it, lay it flat and thin upon the Ground for a Night and Day at the moſt; and then, as Houſewives call it, tie it up in Baites, and ſet them upright till you can conveniently carry them to the Water; which ſhould be done as ſpeedily as may be. When waſhed and dried, it is to be broke, and beat on Blocks, *&c.*

Flax is to be managed much like Hemp, except as follows: For it being more tender than Hemp, you muſt weed and trim it, till it gets above all the Weeds, and then it will ſhift for itſelf. Flax needs to lie in the Water leſs than Hemp. Whereas Hemp may be carried to the Water within a Night or two after Pulling; Flax muſt be reared up, dried and withered a Week or more to ripen the Seed: This done, you muſt take Ripple-Combs, and ripple the Flax over; which is the beating or breaking from the Stalk the round Bells or Bobs that contain the Seed; which you muſt preſerve in ſome dry Veſſel or Place till Spring, and then beat or threſh it for Uſe; and when your Flax is *rippled*, you muſt ſend it to the Water.

Flax, which ripens a little after the Hemp, you ſhall pull as ſoon as the Seeds turn brown, and bend the Head to the Earthward; for it will afterwards ripen of itſelf. The Seed of Hemp is a proper Food for Birds; and it will make Poultry lay Eggs often in the Winter: Some with the Coals of the thickeſt Roots of Hemp-ſeed make Gunpowder.

Before I leave this Head, it ſhould be taken Notice of, that Flax grows and thrives exceedingly in new broken up Ground that is rich and mellow; and there it is commonly ſown for a full Crop. There is only one Inconvenience which ſometimes attends it in ſuch Grounds, *viz.* that the Grub, a black and fulſom Inſect, ſuch as eats Cabbages and Cauliflowers, will in ſome Years ſeize it, and if not deſtroy'd in Time will greatly damage the Crop. The beſt Way to remove this Evil, is to gather them up in *May* before Sun-riſe; for then they all appear above-ground working their Miſchief. But as ſoon as the Sun is up, they retire an Inch or two within the Surface.

N. B. In *Derby* and *Nottinghamſhire*, where a great deal of Linnen is made, they have found out an expeditious Way of ſaving the laborious Work of *Beating Hemp.* They make the Axle-Tree of the great Wheel of their Corn-Mills longer than ordinary, and place Pins in them to raiſe large Hammers, like thoſe uſed for Paper and Fulling-Mills; and with the Help of theſe, they remove that laborious Work from Mens Hands, and beat moſt of their Hemp.

Of TURNEPS.

THERE is nothing, which of late Years has turned to greater Profit to the Farmer, than Sowing of *Turneps* in his Fields; which not only give quicker Feed and Proof to Cattle than Graſs, but alſo enrich the Land, and diſpoſe it for good Crops of Corn afterwards, provided the Work be carried on with Knowledge and Diſcretion. And that I may give ſome ſeaſonable Directions herein, and becauſe the Practice has met with great Diſcouragements from the Ignorance of ſome, and the Raſhneſs of others; I ſhall be particular in laying down proper Rules, and directing the moſt likely means, that thereby the End of Riches and Improvement may be moſt effectually anſwered.

The Turnep hath been formerly thought to be a Root only fit for the Garden and Kitchen Uſe; but the induſtrious Farmer finds it now to be one of his chief Treaſures, as (if rightly managed) it brings him in the greateſt Profit. There are reckoned to be only three Sorts of them, all of them equally good, if ſuited to a proper Soil; the *Round*, which is the moſt common, the *Yellow*, and the *Long*, which requires ſomething a deeper Soil than the other. It delights in a warm, mellow and light Ground, rather gravelly and ſandy than otherwiſe: However, there is hardly any Soil which it refuſeth, except it be a ſtrong untractable Clay; for the pooreſt Soil, with a little Pains and Coſt, may eaſily be made to be a fit Recipient for it.

From the Beginning of *June* to the Middle of *Auguſt*, is a proper Seaſon for ſowing them for Winter Uſe. If they are ſowed ſooner, they run to Seed; and if much later, they will not have Time to *apple* well (as they call it) before Winter. The Land where they are to be ſown, ſhould be fallowed once or twice, and made as fine and free from Clots with the Harrow as may be. After which, in *June*, *July* or *Auguſt*, as the Seaſon ſerves, the Seed may be ſown and harrowed in with a Buſh or Thorns on the Back of the Harrow; and, if need be, rolled alſo to break the Clots, and lay the Land level for houghing; which is a Work

that

that muſt by no means be neglected, though it is too often thought unneceſſary; for the Turneps will never bottom well without houghing, and yet the *Bottoms* are much more profitable to Cattle than the *Tops*.

For which Purpoſe therefore, when the Plants have two or three Leaves a-piece, a dextrous Artiſt provides a Hough about five or ſix Inches wide, to determine in great meaſure the Diſtance of the Plants; and ſo by fixing his Eye upon one only at a Time, he proceeds regularly, and clears his Way. One Man at Twelve-pence a Day Wages, will finiſh an Acre in in four Days; but there is ſometimes a Neceſſity to run over them again a ſecond Time with the Hough; which Labour and Charge will be more than doubly repaid in the Goodneſs of the Crop. If too much Wet, or the Richneſs of the Ground, cauſe them to run too much to Leaves, which is a Fault, the feeding of them, or running over them with a light Roller, will much help their rooting.

But foraſmuch as Turneps are directed to be ſown about *Midſummer*, which frequently proves ſo dry that the Seed will not come up for want of Moiſture; therefore the *Seaſon* is carefully to be watched, and the Seed ſhould be ſowed after a Shower, or if poſſible before it. And if, notwithſtanding this Care, the following Seaſon prove ſo dry that the Seed will not come up, there is yet room for a ſecond and a third Attempt, and no Place for Diſcouragement: For the Seed is cheap, and runs a great way, and the Trouble of harrowing it in a ſecond or a third Time not very great. The greateſt Misfortune which attends the *Turnep* in Summer is, they are ſubject to be eaten with a little Black Fly at their firſt coming up, chiefly where the Land is over-poor and worn out: To prevent which, ſome propoſe the ſowing *Soot* upon them. However, (as was before obſerved,) the Seed is cheap, and the Labour of re-ſowing ſmall; and, which is a valuable Circumſtance, the Farmer has Time enough to look about him.

Some ſow them upon the Stubble as ſoon as the Corn is off, and only harrow them in; which will prove a good Relief in the Spring to Ewes and Lambs, eſpecially if ſown on ſuch Land as is intended to be fallowed; for then they may remain till the Beginning of *May*, the ſcarceſt Time for Food; and yet if a hard Winter ſhould deſtroy moſt of them, the Loſs of Seed or Labour will not be much.

But for the Management of ſuch as have been ſowed and taken care of in the proper Seaſon, as there have been great Miſtakes, ſo it will be the more neceſſary to give ſome Directions. In *Suffolk*, and many other Places, they are wont to give the *Turneps* to Cattle in the Houſe, as judging they feed faſter, and do no Harm with their Feet. And in this Method, ſome cut the Turneps in Pieces to make the Food readier for large Cattle: But becauſe this hath ſometimes proved fatal, in tempting them to ſwallow it without chewing, and ſo choke them; therefore others give them *whole*, and think their Cattel thrive and grow fat without the Trouble and Danger of cutting. If large Cattle are to be fed with Turneps, the laſt Method is undoubtedly the beſt and ſafeſt. But

There is a much more profitable Way to the Farmer than either of theſe, which is little taken Notice of, and yet I think ſhould be univerſally practis'd; *viz.* to eat the Turneps in the Winter with Flocks of Sheep; either *Weathers* to make them fat, or *Ewes* the better to feed their Lambs; not ſuffering them however to ramble over the whole Field of

Turneps at once; but confining them by way of *Folds* and *Hurdles* to ſmall Parcels at a time, till they are throughly eaten; and then removing the Fold to another Place; and ſo on 'till the Whole is conſumed both Top and Bottom.

This Method is much to be preferred to any of the other Ways, for theſe following Reaſons. (1.) Becauſe the Danger of choaking Cows and Oxen, as well as the Trouble of gathering the Turneps for them, is hereby avoided. (2.) Becauſe taking the Crop from the Land is a great Wrong to it; and the End of Improvement by this Method, with reſpect to the Land, is loſt. But (3.) which is moſt conſiderable, this Method of eating them with Sheep gives ſuch a ſtrange and uncommon Fertility to even the pooreſt Land, that two or three good Crops of *Barley*, *Wheat* and *Rye* may be depended upon afterwards, with little other Manure but good and ſeaſonable Tillage.

It muſt be owned to be a Piece of great Neglect in the Farmers of the *North*, that they are not eaſily to be brought into this Piece of good Husbandry; and have little elſe to ſay to excuſe themſelves from the Practice, but that the common People would rob them of the beſt Half. Whereas, if we could ſuppoſe neither Law nor Juſtice would reſtrain them; yet, if it was once become the common Practice of the Country, the Loſs ſuſtained by Thievery would fall amongſt a great many, and conſequently be the leſs diſcernible and hardly worth lamenting.

If it were but well conſidered, what a great Number of Sheep an Acre of Turneps will ſuſtain, even *Twenty* during the Winter Seaſon, and make them likewiſe fat by *Lady-Day*, both the Grazier and Farmer would join iſſue with this Reaſoning ſupported by Experience; eſpecially ſeeing the Land need not be very rich, and that they may be ſown as a ſecond Crop ſometimes after early Peaſe; and that the ſame ſupplies the great want of Fodder during the Winter, not only for fattening Beaſts and Sheep, but alſo for Milk.

Every one knows that the Turnep is an uſeful and much approved Root for the Kitchen; and yet it is remarkable, that tho' Cows, Oxen and Sheep eat them greedily enough, Hogs will not touch them.

I was lately inform'd by a Friend, that he hath frequently received great Relief and Benefit in ſevere Fits of the Gout and Rheumatiſm from only a Poltice of *boiled Turneps* maſh'd, and laid on the Part moſt affected as hot as can well be endured; and this he repeated twice a Day to his great Eaſe.

I cannot here forbear mentioning a Conjecture (grounded on a ſurpriſing Obſervation mentioned in the *Tranſactions* of the R. S.) to ſhew the Reaſon why *Turneps* improve Land. They will often increaſe Eleven, Twelve, Thirteen, nay more, perhaps many more times the Weight of the Seed every Minute from the Time they are ſown to the Time they are drawn, at leaſt till they arrive at their full Bigneſs. This Nouriſhment is in great meaſure probably fetch'd from the Earth below the reach of the Plough, and ſo the Vegetable Matter which would otherwiſe have always lain idle, is drawn up near the Surface. Beſides alſo, ſince we not only *perſpire*, but alſo *attract* through our Pores; and ſince we are ſure the *Sedum Arboreſcens* can gain great Nouriſhment from the *Air*; it ſeems probable that Turneps alſo may collect from the *Air* vaſt Nouriſhment, and ſo by being ſuffered to rot, *give* the Soil Vegetable Matter which it never *received* from thence. The Fact on which this is built is certain, and the Reaſon is at leaſt plauſible and worth conſidering. Turneps therefore may not only *open* and *mellow*, but truly *enrich* with new Materials the Earth: And this (if true) may ſhew why ſome Plants ſo terribly impoveriſh the Earth, whilſt others do it no harm; ſome throwing off by Perſpiration vaſt Quantities of Vegetable Matter into the Air, others receiving and retaining much from it.

Of CARROTS.

THE *Carrot*, *here*, is to be treated of, not as a *Garden* but a *Field*-Plant; for in many Places, where the Soil is proper, they ſow an Acre or two of them together, eſpecially near *London*, where there is a large Conſumption, and for the Advantage and Profit of the Seed. Their Roots running conſiderably downwards, the Plough will hardly give ſufficient Tillage, except where the Ground has been digged to bring up a new and freſh Soil, which in many Places is practiſed with Profit and Succeſs: *Here* indeed it is of ſingular Advantage to ſow Carrots, which require much the ſame Care in Houghing as Turneps, and delight chiefly in a rich warm light Soil, rather inclining to Sand. There are two ſorts of them, the *Yellow*, and the *Red*; and the latter is much to be preferred for the Kitchen. Both Sorts anſwer the Farmer's Expectation and Profit, chiefly in feeding his Hogs, and ſometimes his Geeſe. The Place where they grow ſhould be well fenced, and the Seed ſown the latter End of *February*.

Of RAPE *and* COLE-SEED.

THE ſowing *Theſe*, is another excellent Piece of Husbandry, in proper Soil; for marſhy and fenny Lands, eſpecially ſuch as hath been newly recovered from the Sea, admit theſe with great Improvement: But indeed, almoſt any Land that is warm, rich, and not overwet, is proper for Rape and Cole-ſeed. The beſt of which is uſually brought from *Holland*; and four Pounds of it, which coſts not above four Pence, will ſow an Acre.

The Time of ſowing it is about *Midſummer*; but the Land muſt be twice fallowed, and laid even and fine with the Harrow before it is ſown. The chief End of ſowing it, and for Uſe, is Oil; of which it affords a great Quantity, and for which there is a great Demand. But there is beſides another End in ſowing it; for it is a great Support to Cattle in the Winter-Months, when other Food is wanting. In the more ordinary Sorts of Land, this is indeed the chief Uſe of it; becauſe only in the richeſt Lands, where it grows ſtrongeſt, it is reſerved for Seed.

Sometimes, if the Winter prove mild and open, it produces a good Crop the next Year alſo; and even after cutting, the Stubs thereof will ſprout and afford great Relief to Sheep; which are cautiouſly to be truſted with it at firſt, for fear of burſting them. What is reſerved for Seed, is generally reap'd as Wheat, after it begins to look brown, letting it lie near a Fortnight to dry, without ſtirring it, leſt it ſhed its Seed. To avoid which Danger, it is either wont to be threſhed in the Field on large Sheets, or therein they carry it to the Barn and threſh it immediately. It is obſerved that Barley and Wheat do very ſuitably follow theſe Crops, as finding the Land well diſpoſed for them.

In *Lincolnſhire*, Mr. *Mortimer* obſerves, where Fuel is ſcarce, after the Oil is preſſed out, they burn the Cakes to heat their Ovens: But if the other Uſe he mentions be to be depended upon, it is much better; for in *Holland*, he ſaith, they feed their Cows with them in hard and ſcarce Winters; and in ſome Parts of *Northamptonſhire*, (near the Fenns I ſuppoſe) they give it their Calves from three or four Days old, inſtead of Milk; with which they thrive, till they come to eat Graſs and Hay.

Of WOAD.

THIS being a very rich Commodity, it is worth the Husbandman's Notice and Care in cultivating it; becauſe it is often found, that he *doubles*, nay *quadruples* the Rent of his Land thereby. The chief Misfortune is, that it will not thrive every where; for it requires a very rich and warm Land, and ſuch as hath not been uſed in Tillage for ſome Years; and *here* alſo no more than two Crops muſt be expected; only it admirably diſpoſes the Land, and makes it clean for Barley afterwards.

It is obſerved of late Years, that there are many Sets or Companies of People, Men Women and Children, who undertake the *Whole* of this Buſineſs; hiring Land, building Huts or Houſes, ploughing the Land, ſowing the Seed, gathering the Woad, and doing every Thing elſe to fit it for the Dyer's Uſe. And ſo, when their End is anſwered, they remove from Place to Place, as they can find Land for their Purpoſe.

The Land muſt be finely ploughed and harrowed for this Seed, leaving no Stones, Clots or Turfs thereon; and it muſt be continually weeded till the Leaves cover the Ground. Early ſowing, it is thought, greatly prevents the Fly and the Grub, to which it is ſubject as well as the Turnep; accordingly, if the Weather ſuffer, it ſhould be ſown in *February*.

The firſt Crop is ripe, when the Leaf is come to its full Growth, and retains its lively Greenneſs; and then no Time ſhould be loſt in cutting it, leſt it grow pale and fade, which would be a great Prejudice to it. It ordinarily yields four, and ſometimes five Crops in a plentiful Year, beſides the Winter-Growth, which is very helpful to Sheep. The two firſt Crops are the beſt, and therefore ſhould not be mixed with the other, but carried immediately to the Mill ſeparate; and the ordering of it *there*, is beſt learnt from experienced Workmen. It ſells from ſix to thirty Pounds a Ton, which is the ordinary Produce of an Acre. Before the Ground is ploughed the ſecond Year, they reſerve a Place by itſelf, where are ſome of the beſt Plants; and theſe are preſerved for Seed for future Uſe. It is uſed by Dyers to lay the Foundation of many Colours, eſpecially thoſe that are dark.

Of WELD.

THIS is a rich Commodity, uſeful alſo to the Dyers for all ſorts of bright Yellows, and Lemon Colours; and is the more valuable, conſidering the eaſy Charge of raiſing it, and that it will grow upon ſome of the worſt Land. *Weld* is one of the capſulate Herbs, whoſe Flowers conſiſt of four Leaves; and is further diſtinguiſhed by the Flower in reſpect of its Colour, being a yellow large Plant, whoſe Leaves are of a bluiſh Green, long and ſmooth.

It is remarkable, that in many Places, particularly in the Biſhoprick of *Durham*, it grows wild; and yet is there much neglected, by reaſon neither the Plant nor its Value is ordinarily known.

However, it is ſown with Care in many Places of *England* to great Advantage; for, as I have obſerved, it will grow on any ordinary Land, provided it be dry and warm. It may be ſown after Barley or Oats when they are harrowed, this requiring only a Bruſh to be drawn over it. A Gallon of Seed will ſow an Acre, it being very ſmall; for which Reaſon it is good to mix it with Duſt or Sand, by which Means it may be the better diſperſed with the Hand. It grows not much the firſt Summer; but by preſerving it from Beaſts and Annoyances after the Corn is gathered, you may the next Summer expect a Crop.

The Seed ſhould be carefully gathered before it is too ripe, leſt it ſhed. It is pulled, as they do Flax, by the Roots, and bound in little Handfulls, ſet to dry and then houſed. After this, they beat out the Seed, which is of a good Value; and ſell, not the Leaves, but the Stalk and Root to the Dyers, for the Uſes aforeſaid. The Seed is ſometimes worth Ten Shillings a Buſhel; and the whole Value of an Acre's Crop, Seven or Eight Pounds.

Of SAFFRON.

THAT which grows in *England* is eſteemed the beſt in the World, and ſhould therefore be more propagated than it is. *Saffron* is of the Crocus-kind, of which there are great Varieties both of Vernal and Autumnal Flowering. But the true *Saffron* appears in *September*, with Flowers like a blue Crocus; and in the Middle of it come up two or three Chives growing upright, as the reſt of the Flower explains itſelf and ſpreads abroad.

It delights in a warm mellow Soil well cultivated, and is planted and increaſed by the Roots; ſet according to ſome in *March*, and by others at *Midſummer*, when its Leaves die into the Ground. This Root is much propagated in *Cambridgeſhire*, and about *Saffron-Walden*, from whence it takes its Name; and there they ſet them in Ranges, which they make with a large Hough about two or three Inches deep, and at five Inches diſtance one from another. After one Range is finiſhed, they begin another; covering the firſt with the Earth of the ſecond Range; and ſo on till the Whole is finiſhed, ſetting each Root three Inches aſunder.

The Time of Gathering is, when it firſt begins to flower in *September*, when the Yellow Chives appear in the Middle of the Flower, which are gently to be gathered by the Finger and Thumb early in a Morning before it retires into the Flower again. For this purpoſe as many Hands are to be employed as the Quantity of the Land requires, and as long as the Seaſon continues, which is about a Month. It muſt be dried with a gentle Heat and conſtant Attendance; whereby it muſt be expected that at leaſt two Thirds will dry away and loſe its Weight; by which yet it is generally ſold, and at a dear Rate too ſometimes, even from Twenty Shillings to Five Pounds a Pound Weight; an Acre uſually producing Ten or Twelve Pounds. Out of this Profit is indeed to be deducted the neceſſary Charge of Planting, Houghing and Gathering, which is uſually computed at Four Pounds an Acre: However, as they continue in the Ground increaſing and multiplying at the Root, and need not be removed or planted only once in Three Years, the Charge of *Planting* muſt not be accounted annual.

Mr. *Mortimer* tells us, that in ſome Parts of *Oxfordſhire* there is a ſort of Baſtard-Saffron called *Safflow*, which the Dyers uſe for Scarlet, which they plant in Rows about a Foot diſtance for the Convenience of houghing. It grows upon a round Stalk Three or Four Foot high, and at the Top bears a great open ſtalky Head, out of which proceed many gold-coloured Threads of a moſt ſhining Colour, which they gather every Day as they ripen, and dry them.

We have Saffron brought from *Spain*; but it is a ſort much worſe than our own Growth, and of much leſs Value.

Of Liquorice.

THIS being a Plant that brings in great Profit to the induſtrious Planter, I thought it proper to give it a Place here, and to ſay ſomething to direct and to encourage its Cultivation. It grows naturally wild, and in Soils not over-rich. I find it my ſelf extending its Roots even amongſt the Lime-ſtone Rocks, but very ſmall and ſlender: However, it deſerves better Encouragement, for its Productions are always anſwerable to the Goodneſs of the Soil. It loves a deep warm and rich Earth inclining to Sand; accordingly it hath been much planted near *Northampton* and *Pontefract* in *Yorkſhire*, where the Land will bear trenching at leaſt three Spit deep, and ſhould be laid as light as poſſible. If Dung is uſed to mend the Soil, it ſhould be dug in before Winter, and at planting in the Spring dug over again. Old rotten Dung is beſt.

The beſt Sets are thoſe taken from the Top of the old Roots; but the Runners alſo, which ſpread from the Maſter-Roots, may be made uſe of with great Succeſs. Even the Branches when ſlip'd and planted will grow in a wet Year, and will ſerve to fill up all thin Places.

February and *March* are the Months for planting *Liquorice*. The Plants are ſet with Sticks at about a Foot diſtance; and becauſe they are impatient of the Sun or Wind, they ſhould be as little out of the Ground as poſſible; and conſequently, if they are removed to any diſtance, great Care ſhould be taken that the Roots be kept moiſt. The firſt Year after Planting need not be loſt, for *Onions* and *Lettuce* may be ſow'd intermixt.

After it has ſtood Three Years it may be dug up for Uſe; and the ſooner it is diſpoſed of the better for the Planter, becauſe while it is green it preſerves its Weight. We are told, that One Hundred Pound hath been made of an Acre of Liquorice; but, I ſuppoſe, now the Plenty diminiſheth its Value. However, this is certain, that the better the Land is the more is the Profit, every one coveting the largeſt.

This is a conſiderable Article in the Apothecary's Shop, and is uſed medicinally various Ways.

Of

Of MADDER.

MADDER is an Herb that is *ſtellate*; ſo ſtiled from the Manner of the Growth of the Leaves, which encompaſs the Stalk at Intervals, like the Rays of a Star, diſtinguiſhable by bearing leſſer Flowers, ramping, of broader Leaves, having a red Root uſed for dying Scarlets.

The Sum of what Mr. *Worlidge* ſays of Madder, in his *Syſtema Agriculturæ*, is, that it is a rich Commodity much uſed by Dyers and Apothecaries, and a Plant that delights in our Climate. It is to be planted in a very rich, deep, warm and well manured Land, dug at leaſt two or three Spade deep: About *March* or *April*, as ſoon as it ſprings out of the Ground, it is to be there planted. The Sets are to be gathered two or three Inches long, with Roots to them, and immediately planted, or put into Mould, if carried far; and then ſet about a Foot apart, and kept watered till they ſpring, and continually weeded till they have gotten the Maſtery of the Weeds. At three Years End you may take it up; reſerve the Plants for the Uſe of your ſelf or Neighbours, and ſell the Roots to the Apothecaries, or dry them for the Uſe of the Dyers.

Dr. *Sprat*, in his *Hiſtory of the Royal Society*, gives an *Apparatus* to the Hiſtory of the common Practices of Dying, by Sir *William Pettit*. He ſays, Bran-Liquor contributes ſomething to the holding of the Colour; for we know Starch, which is nothing but the Flower of Bran, will make a clinging Paſte, the which will conglutinate ſome Things, tho' not every Thing, *viz.* neither Wood nor Metals. Now Bran-Liquors are uſed to mealy dying Stuffs, ſuch as Madder is, being the Powder or *Fecula* of a Root; ſo as the Flower of Bran being joined with the Madder, and made clammy and glutinous by Boiling, he doubts not but both ſticking upon the *Villi* of the Stuff dyed, the Madder ſticks the better, by reaſon of the ſtarchy Paſtineſs of the Bran-Flower joined with it.

Madder is a Root cultivated much in *Flanders*; it is uſed to dye on Cloth a Colour the neareſt to our Beau-Dye, or New Scarlet; and the Colours called Baſtard Scarlet are dyed with it.

Sometimes the Madder hath yielded eight or nine Pounds the Hundred Weight; the beſt more, and the worſt ſomething leſs; for there is great Difference in its Value: It is Pity it is not more cultivated, inaſmuch as there is a great and conſtant Demand for it, both from the Apothecaries and Dyers. Some of the latter have been known to uſe a Hundred Pounds worth in a Week.

Of Teasils.

Mr. *Mortimer* tells us, that in ſeveral Parts of *Eſſex* they ſow *Teaſils* upon Lands already ploughed for Corn in *Autumn*, double-furrowing it in *December*; and after that, in *February* or *March*, they ſow the Seed, a Peck upon an Acre. But in *Berkſhire*, and about *Reading*, a Friend of mine is wont to cultivate ſeveral Acres of *Teaſils*: But he manages them after a better and more rational Method, and finds a very good Account and Increaſe in it. The Plants ought to have two Summers to bring them to Perfection, like Cabbages. Only they ſhould be ſowed in the Spring, and ſuffered to ſtand in the Seed-Bed all the Summer cleanly weeded; and then either in *Autumn*, or in *Spring* following, tranſplanted into the ploughed Field, ready prepared for them; where they are to be ſet regularly in Lines at about a Foot aſunder. By which Management, they arrive to great Maturity and Bulk. This is a Commodity that is carried from *England* into foreign Parts, being no where elſe (as far as I can learn) cultivated. They are uſed in the dreſſing *Bays* and fine *Cloths*; and only this kind of Thiſtle is fit for the Purpoſe, and is ſo neceſſary for *that* End, that the *Dutch* eagerly covet them, and purchaſe them almoſt at any rate. There have formerly been vaſt Advantages made of them; an Acre commonly producing One Hundred and Sixty Bundles at One Shilling a Bundle, and ſometimes double. But I ſuppoſe the Markets of late have been more glutted or over-ſtock'd. They cut them in *Auguſt*, tying them up in Bundles or Staves to dry before they houſe them. A mixt loamy Soil is ſuppoſed to be beſt for them.

Of

Of HOPS.

THE *Hop* is an Herb of Stamineous Flowers, whoſe Seeds are round, diſtinguiſhable by Sex of Male and Female; becauſe from the ſame Seed ſome Plants are produc'd which bear Flowers and no Seeds, and others which bear Seeds and no Flowers.

It is of the bigger ſort of Herb, having a divided Leaf, and being a climbing Plant, twiſting about ſuch Things as are next to it, from the *Left* toward the *Right* Hand, contrary to the manner of ſome other twining Plants; of a rough roundiſh Leaf, divided into many Segments, with a Head of ſcaly Tufts growing in a Cluſter or Bunch. It is commonly uſed to preſerve Drink from ſowering, and will preſerve it ſometimes Fifteen or Twenty Years.

This Plant delights in the richeſt Land, a deep Mould and light; if mix'd with Sand it is the better; and a black Garden Mould is excellent. To lie near the Water, when it may be laid dry, and have a low mellow deep Ground, inclining Southward, and defended by Hills or Trees from Weſt, North and Eaſt, that it may lie warm, is beſt; but almoſt any Ground may do, except ſtony and ſtiff Clay. The *Aſh* on a dry, and the Poplar or Aſpen on a moiſt Ground, make the beſt Shelters to the Hop-Garden.

If the Land be cool, ſtiff, ſour or barren, burn it at the latter End of the Summer, and then ſow Turneps, Hemp or Beans, to mellow and lighten the Ground, and deſtroy the Weeds. Whatever it be, *Till* it in the Beginning of Winter with Plough or Spade, making it even; and marking out the Places where the Hills are to ſtand; which is beſt done by a ſtreightned Line over-thwart the Ground, with Knots at the Diſtance you intend the Hills.

Some plant Checquer-wiſe; which is beſt, if you would plough between the Hills: Others plant in the *Quicunx* Form, which is moſt beautiful and better for the Hops, eſpecially in a ſmall Ground where you muſt uſe a Breaſt-Plough or Spade. In either pitch a Stick, where each Hill is to be; and if the Ground be cold or ſtiff, lay on it the beſt Mould, or Dung and Earth mix'd; and at every Stick dig a Hole about a Foot ſquare, and fill it with the Mould or Compoſt, and there ſet your Plants, which will ſoon repay your Charge and Trouble.

Hops in a dry Ground are planted about Six Foot diſtant; but in deep, moiſt, rich Mould, that will bear large Hops, Eight or Nine Foot is the proper Diſtance; and ſo plant according to the Goodneſs of the Soil. If the Hills are over-diſtant, increaſe the Roots in each Hill, and ſo you will apply more Poles; and if the Hills are leſs diſtant, *contra.*

A great many plant at the End of *March*, or in *April*, and this is the common Practice; but undoubtedly it is beſt in *October*, when the Hops will ſettle againſt the Spring. Get the largeſt Sets from a Garden well kept, and where the Hills have been raiſed very high the preceding Year, which will increaſe the Plants in Number and Bulk. Let the Plants be Eight or Ten Inches long, and in each Three or Four Joints or Buds: Dig the Holes Eight, Ten or Twelve Inches deep, and about a Foot over, before you take the Sets out of the Ground; elſe you muſt lay them in cold and moiſt Earth, and take them out as you have Occaſion. Some ſet Two or Three Plants upright in the Middle of the Hole, and hold them hard together with one Hand, while they fill the Hole with the other with fine Mould made ready before-hand, obſerving to ſet the Tops even with the Surface of the Ground, and then faſten well the Earth about the Roots. Others plant one Set at each Corner of the Hole, which is well approv'd; and 'tis good to raiſe the Earth Two or Three Inches above the Set, unleſs you plant ſo late that the green Sprigs are ſhot forth, when a total Covering will deſtroy them.

If Hops are worn out of Heart, then about the Beginning of Winter dig about them, and take away the old barren Earth, and apply good fat Mould or Compoſt to their Roots; be ſure this be done before *February*, in open Weather; and ſuch Winter-Dreſſing will renovate the Hop, and deſtroy the Weeds; but for hearty ſtrong Hops, late Dreſſing is moſt proper, *viz.* in *March* or the Beginning of *April*, which will keep them from too early ſpringing, that brings many Injuries.

In Dreſſing of your Hops, pull down the Hills, and undermine round, till you come near the principal Roots, and then take the upper or younger Roots in your Hand, ſhaking off the Earth; which Earth being removed with your Tool, you ſhall diſcern where the new Roots grow out of the old Sets, which Sets you muſt be careful not to ſpoil. You need not mind the other Roots, for they may be cut away, except ſuch as you mean to ſet. Uncover only the Tops of the old Sets in the firſt Year of Cutting; and at what Time ſoever you cut down your Hills, cut not the Roots before *March*.

At the firſt Dreſſing, you are to cut away all ſuch Roots or Sprigs as grew the Year before, out of your Sets, within one Inch of the ſame. Our ancient Writers ſay, they muſt be cut cloſe like Oſiers; but Experience teaches, 'tis good for a weak Hop to leave ſome principal new Shoots at the Dreſſing, and that clean Cutting hath very much damaged a Hop-Garden. Cut not the Roots that grow downward, but ſuch as grow ſideways which may incumber the Ground. The old Roots are Red, the laſt Year's White. When you have dreſs'd the Roots, then apply your rich Mould or Compoſt prepar'd for that purpoſe; and make the Hill not too high at firſt, leſt you hinder the young Shoots: When you dreſs you may cut the Hops, tho' they are ſprung out of the Hills. Be ſure to keep Poultry from the Hop-Garden; and if there be any wild Hops, take up the whole Hill and new plant it.

Provide Poles enough according to the Diſtance of the Hills, and according to the Strength of the Hop, the Length or Bigneſs. If the Hills be far diſtant, ſet Four or Five Poles to each Hill; otherwiſe Two or Three. In hot, dry and hungry Ground, the Poles may ſtand thicker than otherwiſe. If the Hops be ſtrong, and the Ground rich, you are to get large Poles; if otherwiſe, the contrary: For the Hop will run out of Heart, if over-poled; and be ſure not to over-pole the firſt Year, altho' they ſhould require as many Poles (or rather Rods) the firſt as any other Year. *Alder* Poles are eſteem'd the beſt, by reaſon of their Streightneſs, taper Form, and rough Rind, which ſuffers not the Hop eaſily to ſlip down: The *Aſh* is moſt laſting, eſpecially if they grow on barren Lands; ſome will laſt Ten or Twelve Years. *N. B.* Forked Poles bear the greateſt Burdens.

Lay the Poles between the Hills before you begin to ſet them in the Ground. *Pole* when you ſee the *Hops* above Ground, and continue till they are a Yard high; but ſet the largeſt Pole to the ſtrongeſt Branches: And ſo deep likewiſe, that it may ſooner *break* than *ariſe* out of the Ground by Winds. Let the Poles lean outward one *from* the other, and ſtand equi-diſtant at the Top, to prevent growing too near each other in any Part; which will make Shade, and cauſe more Hawm than Hops. N.B. *Leaning Poles bear moſt Hops.* Be ſure to preſerve a Parcel of the worſt Poles, in caſe a Pole ſhould break, or be over-burden'd. Ram the Earth on the Out-ſide of the Pole, to ſecure it from Winds. If the Hop be under or over-poled, you may unwind it, and place another in its ſtead, having ſome one to hold the Hop, whilſt you pitch in the Pole; or you may place another near, and bring the Hop to it.

When the Hops are Two or Three Foot out of the Ground, wind them on the neareſt Poles, or ſuch as have feweſt Hops; or at leaſt place them to the Pole, that they may wind themſelves *with* the Courſe of the Sun, binding them gently thereto with ſome wither'd Ruſh or woollen Yarn; Two or Three Strings are enough to a Pole: 'Tis beſt doing this when the Warmth of the Day hath toughened the Shoots; in the Morning 'tis more dangerous. During the Months of *April* and *May* the Hops muſt be daily directed, leſt they break themſelves by going amiſs: And a forked Wand, a Stool, or a Ladder with a Stay on the Back, are of uſe to direct the Hops to the Poles. About *Midſummer* the Hop begins to leave running at Length, and to branch; therefore ſuch as reach not the Top of the Poles, it would be well to nip off the Top, that it may branch the better, which is preferable to their growing in Length: But Care ſhould be rather taken not to *overpole* them; for they never bear well, except their Extremities be ſuffered to hang down Five or Six Foot. And this, by the way, is another Demonſtration that Vegetables are *leaſt* prolific in a perpendicular Poſture, and moſt prolific in an horizontal or inverted one.

To make up the Hills, after Rain in *May*, pare the Surface with a Spade or Hough, or run it over with a Plough; and with theſe Parings raiſe your Hills in Height, burying and ſuppreſſing all ſuperfluous Shoots of Hops and Weeds. Thus will you hinder the Droughts in Summer to injure them, and the Hops will ſend forth their Roots to the Surface of the Earth, and thereby they imbibe what Moiſture ſhall happen. This Work may be continued throughout the Summer, but more eſpecially after Rain.

Be ſure to keep your Ground in good Heart; and in a dry Spring, *water* your Hops before you raiſe your Hills. In hot and dry Grounds a dry Spring checks the Hop in its firſt ſpringing. Uſe what Water you can get; but what is gotten in a Pond made with Clay, at the lower End of your Ground, is beſt. In the midſt of each Hill thruſt ſome pointed Stick or Iron down the Middle, and pour in your Water by degrees till the Hill is well ſoaked; then cover the Hill with the Parings of your Garden. In a dry Summer give each Hill a Pail-full of Water two or three times: After every Watering make up the Hills with the Parings, Weeds, the cooleſt and moiſteſt Materials you can get; for the more the Root is ſhaded, the better it thrives; even many fare well that have natural Shelter and are never dreſt.

To-

Towards the End of *July* Hops *blow*, and a Week or Fortnight after they *bell*, and in forward Years are ripe the latter End of *Auguſt*. When the Hop or its Seed turn a little browniſh, or when they are eaſily pulled to pieces, and ſmell fragrantly, conclude they are ripe, and gather them with many Hands before they ſhatter, for a Wind may do great Damage.

The way of Gathering is to take down four Hills in the midſt of the Garden; cut the Roots, level the Earth, throw Water on it, tread and ſweep it, and ſo ſhall it be a fair Floor to lay the Hops on for Picking. On the Outſide of this Floor the Pickers ſit and pick the Hops into Baskets, the Hops being ſtript from the Poles, and brought to the Floor. Clear your Floor twice or thrice in a Day, and ſweep it clean. This is beſt for ſtrait Poles, and ſome pick them ſitting diſperſedly: But the beſt way is to faſten a Hair Cloth or Blanket on a Frame made of ſhort Poles, and ſet on four Stakes; on which lay the Poles with the Hops on them, and pick them into the Blanket; when 'tis full, remove them, and ſo on, removing the Frame as occaſion ſerves. This Way ſaves ſtripping the Hops from the Poles; neither are any ſcattered by ſtripping, and they are all in Sight, and ſooner pick'd.

Before you draw your Poles, with a ſharp Hook on a Pole divide the Hops where they grow on two Poles, and cut them Two or Three Foot above the Hills, elſe the Hop will bleed much of its Strength away. This done, draw your Poles; and if they are over-faſt in, draw them with an Iron Pair of Toothed Tongs, or a Wooden Leaver forked, on which are fixed two Toothed Irons; either of theſe laid over a Block Leaver-like, will eaſily raiſe them. Draw no more at a Time than what will ſerve for an Hour or two, in caſe of very hot Weather, or likelihood of Rain.

In a large Hop-Garden, 'tis worth while to raiſe in the midſt thereof a Shed, under which you may pick your Hops; which will defend both the Hops and the Pickers from the Sun and Storms. Here alſo may be laid Hops unpick'd over Night, to be picked in the Morning before the Dew be off the other; and the Poles may lie here dry in Winter.

Gather no Hops wet; but if the Dew or Wet be on them, ſhake the Poles and they will dry the ſooner. Let not your Hops be over-ripe, leſt they ſhed their Seed (in which their chief Strength conſiſts) and loſe their green Colour, to the Prejudice of their Value; tho' ſome Perſons let them ſtand as long as they can, becauſe they waſte leſs in the Drying. Four Pounds of green Hops thorough ripe will make One Pound of dry, and Five Pounds in their Prime will make One; ſo they think they get more in the Weight than they loſe in the Colour. In Picking, keep them clean from Leaves and Stalks, which will ſpoil their Sale. As faſt as you pick, dry them, otherwiſe they will change Colour; but if you muſt keep them, ſpread them on ſome Floor, not too thick, and by that means the Damage they will receive in a Day or two will not be great. *N. B.* Ill dried Hops are naught, and will ſpoil all they come nigh.

Some make uſe of the broken Poles to dry their Hops; but Charcoal or Cinders are the only Fuel which will not prejudice the Colour, as ſmoaky Wood will: Keep your Fire at a conſtant Heat; and the Hops this way muſt not be ſtirred till thorough dry, which is when the Top is as dry as the Bottom; but if any be not ſo dry as the reſt, (which may be known by their rattling, if you try with a Stick in ſeveral Places) then abate them there, and diſpoſe in the Places where Hops were firſt dry. When they are all dry through, then take out the Fire, and ſhove out the Hops at the Window, with a Coal-Rake made with a Board at the End of a Pole, into the Room prepared to receive them; then go in at the Door below, and ſweep together the Seeds and Hops that fell through, and lay them with the other. This done, lay another Bed of green Hops, and in like manner proceed.

In ſeveral Places they dry their Hops on the ordinary Malt-Kilns (on a Hair Cloth) about ſix Inches thick; and when they are almoſt dry, with a Scoop made for that Purpoſe, they turn them upſide-down, and let them lie till every Hop be thoroughly dried; and then with a Hair Cloth remove them to the Heap. Both theſe Ways are ſubject to Inconveniencies. In the firſt, the Hops lying ſo thick and never turn'd, thoſe under muſt of Neceſſity be over dry, before the upper can be dry enough, and prejudice them both in Strength and Weight; beſides the Waſte of Firing, which muſt be long continued to thorough dry ſo many together. In the ſecond Way, the Turning of the Hops breaks them very much; by forcing the Scoop againſt the rough Hair Cloth, it frets and ſpoils many Hops, and ſhatters their Seeds, elſe this Way is rather to be preferr'd.

But theſe ſeveral Inconveniencies may be prevented, by making the lower Part of the Kiln as before deſcribed, and the Bed after the following manner: Firſt, make a Bed of flat Ledges about an Inch thick and two or three Inches broad, ſawn and laid a-croſs on the other Chequer-wiſe, the flat Way, the Diſtances about three or four Inches; the Ledges ſo entered the one into the other, that the Floor may be even and ſmooth; and this Bed is to reſt on two or three Joiſts ſet Edge-wiſe to ſupport it from ſinking. Cover this with double *Tin* Plates ſolder'd together at the Joints, and ſo order it that the Joints of the *Tin* may lie over the Middle of a Ledge: When the Board is wholly cover'd, fit Boards about the Edges of the Kiln to keep up the Hops; only let one Side be to remove, that the Hops may be ſhov'd off. On this *Tin Floor* the Hops may be turned without Hazard or Loſs, as before on the Hair, and with leſs Expence of Fuel: Alſo any Fuel will ſerve; for the Smoak cannot paſs through the Hops; but be ſure to have Conveyances for it at the Corners and Sides of your Kiln. The Fuel you will ſave, will in a little Time recompence your Charge.

To turn Hops, is troubleſome; but a wooden Cover lined with Tin, to pull up and down, and to hand ſometimes about a Foot over, will, like a reverberatory Furnace, dry the upper Parts. And this is eſteemed the beſt Way to dry Hops; which is the moſt hazardous Piece of Work that belongs to them. This done, you muſt lay them in ſome Room for three Weeks or a Month, that they may cool, *give*, and grow tough; for if bagg'd from the Kiln, they will crumble to Powder; but if they lie cloſe cover'd with Blankets, you may pack or bagg them with greater Security.

The manner of Bagging of Hops is thus: Make a Hole in an upper Floor, big enough that a Man may with Eaſe go up and down, and turn and wind in it; then tack on a Hoop about the Mouth of the Bag faſt with Pack-thread, that it may bear the Weight of the Hops when full, and of the Man that treads them; then let the Bag down through the Hole, and the Hoop will reſt above, and keep the Bag from ſliding wholly through; into which Bag caſt a few Hops, and before you go in to tread, tie at each lower Corner of the Bag an Handful of Hops with a Piece of Packthread to make a Taſſel, by which you may conveniently lift or remove the Bag when it is full; then go into the Bag and tread the Hops on every Side, another caſting them in as faſt as you require it, till it be full. When it is well trodden and filled, let down the Bag, by unripping the Hoop; and cloſe the Mouth of the Bag, filling the two upper Corners as you did the two lower. The Bags well dry'd and pack'd, may be preſerv'd in a dry Place divers Years, if the Mice ſpoil them not.

This done, return to the Hop-Garden, and preſerve the Hop-Poles for another Year: Strip the Hawm clean from them, and ſet three Poles triangular, ſpreading at Bottom, and tied almoſt at Top. Againſt theſe you may ſet all the Hop-Poles; bind them about with a little Hawm twiſted. Thus the outward Poles are only ſubject to the Injuries of the Weather, except the Tops. There are Variety of Ways to preſerve the Poles; but the beſt is, when they are thorough dry, to lay them up in a dry Houſe.

In the Winter you muſt provide Manure for the Hop-Garden againſt the Spring. If your Dung be rotten, then mix it well with two or three Parts of untried Earth, and let it lie till the Spring: This will ſerve to make up the Hills with. If the Dung be new, then when mixed let it lie another Year; for new Dung is injurious to Hops. Horſe-Dung and Cow-Dung are very good; but none can compare with Pidgeon's Dung, if a little only be well mix'd in a Hill, that it may not be too ſtrong in any one Place: Sheep's Dung alſo is very good. In Spring, or Summer, if you ſteep the Dung of Sheep, Pidgeons or Hens in Water, till quite diſſolved; and when you water your Hops, if you put a Diſhful of this diſſolved Dung among the Water you water your Hops with, in the hollow Places made to contain the Water on the Top of every Hill, the Virtue will be carried to the Roots of the Hop, and it may prove the moſt expeditious, advantageous and leaſt expenſive Way of enriching the Hop-Hills, of any other. Thus you may convey to the Roots of any Vegetable the inherent or attracted Virtue in Lime, Aſhes, or any other fertilizing Subject.

Hops were firſt brought from *Flanders* into *England*, *Anno* 1524, in the 15th Year of K. *Henry* the 8th; before which, Alehoof, Wormwood, *&c.* was generally uſed for the Preſervation of Drink. Very great Improvements have been made by Hop-Gardens in the *Weſt* of *England*, but eſpecially in *Kent*. At *Farnham* in *Hampſhire*, *Maidſtone*, &c. the Planters thereabout dig and dung the Hop-Garden about *Chriſtmas*, and ſome time after they raiſe many Hillocks in Rows, about a Yard diſtant from each other: The Plants are ſet about *March*, and then are fix'd into each Hillock three Poles about eight Foot long; but at three Years Growth they ſet Poles of twelve or ſixteen Foot long, according to the Strength of the Ground and the Hops. They are carefully dug and dreſs'd, and gather'd about the Beginning of *September*; after which, being thoroughly dried over a Kiln, they are bagg'd and ſent to *London*.

The Expence of Digging and Dreſſing is about 3 l. an Acre, (but all Expences a great deal more, perhaps thrice as much,) which may probably yield half a Load of Hops one Year with another; which, according to the Price in many Years, may be valued at 100 l.

With taking the Pains that is neceſſary, (and which is every thing,) it has been computed that one or two Acres of Hop-Ground will yield more Profit than fifty Acres of Arable Land; but yet great Allowances muſt be made for the Diſappointments of bad Years, and the Damage ſuſtained ſometimes even in the gathering and curing them. However, (as Mr. *Switzer* rightly obſerves) the Culture of Hops is in the main one of the moſt profitable Employments the Husbandman or Gardener can engage in. And the large Eſtates acquir'd of late by Merchandize in Hops, is a ſufficient Encouragement for others to ſtudy to improve and cultivate this uſeful Plant. Beſides, it is a Manufacture that employs abundance of Hands, and the Poor find Work and Wages almoſt all the Year, from the neceſſary Attendance of Planting, Soiling, Digging, Houghing, Poling, Tying and Picking. So that it is as well a publick Good, as of private Advantage.

The noble Plantations of Hops at *Farnham,* where for Regularity and Exactneſs they appear like Woods and Groves cut into Viſtaes, is a beautiful Sight; and it is not uncommon for thoſe who are aſſiduous and skilful, to make of their Hop-Grounds ſome Years at leaſt 30 l. per Acre, even in large Quantities. But, as I ſaid, Deductions muſt be made for bad Years; which commonly happen in the Proportion of *one* bad one for *three* good ones.

Anniſeed will ripen well in *England,* if ſown at *Michaelmas,* in well prepared Ground, and may turn to good Account to the Farmer: As alſo *Caraway* and *Coriander.* The firſt will laſt three or four Years, if the Ground be kept clean; but it is not fit to cut till the ſecond Year. There is a conſtant Demand for them all; which the Farmer ought to remember.

Of MALT.

MALT may be made of all ſorts of Grain. In the *North, Big* is much uſed; but generally it is made of *Barley*, which ought to be of the beſt ſort. This Barley is put into the Ciſtern, and covered with Water, rather from the Brook than the Spring; and there it lies till the Husk will riſe or ſhell a little from it, which it will do after three or four Nights; then the Water is drawn off, and you are to let it lie eight, ten or twelve Hours to drain. It is beſt to let it have rather *too little* than *too much* Water.

When well drain'd, it is thrown, from ſix or eight Inches thick to a Heap, on the Couch Floor, according to the Weather; and it is ſtirred with the broad caſting Shovel once, twice or thrice, or oftener in a Day. After Couching ſome Days, it will ſweat a little, and begin to ſhew the *Sprit* or *Spire* at the Root-end; and in four or five Days more, it will become long; but, except the Weather grow very cold, it muſt be laid thinner, and ſtirred over three or four Times in a Day; but this differs greatly according to the Weather, and it muſt be minded accordingly; and the *Sprit* muſt ſeldom run farther than half an Inch. Beſides the *Sprit*, there is an *Acroſpire* that grows ſlowly under the Skin unſeen, and the Corn malts no farther than it runs through the Husk; for it carries the Heart of the Corn with it; wherefore it is obſerved that a Malſter muſt take great Pains, and have his Wits about him, or he may be ſoon undone.

The Malt being made, and having lain its uſual Time in the Floor, (which is about Three Weeks in the Winter, and leſs Time in the Summer) it is laid on the Kiln to dry, ſomething thicker than it generally lay on the withering Floor; where, when it has lain about five Hours, with a conſtant regular Fire under it, the *firſt* Turn is given it; about four Hours after that the *ſecond* Turning, and three Hours after that the *third*; and if the Kiln dry well, in three Hours more, with a moderate Fire, it will be dried enough. The Goodneſs of the Kiln, and the Greenneſs of the Malt, makes it ſometimes more and ſometimes leſs Hours in Drying. At *Derby* they have a Brick Kiln, which will dry more in four Hours than was uſually done in twelve Hours. There is great Art in Turning the Malt on the Kiln; and the common Way is to lay all the Malt on an Heap in the Middle; and the Hair-Cloth being laid even, this Heap is caſt round, and the Place where it lay left quite bare, leſt any Corn ſticking ſhould be Fire-fanged. Then the bare Place is fill'd from the Sides; and ſo being raked very even, it is left.

The Malt, when dried, is removed from the Kiln (being thrown on a Heap in the Side next the Granary for that Purpoſe) and laid above a Foot thick, and trod round three or four Times, beginning at the Outſide, and winding to the Middle of the Heap, and ſo back. This is call'd a Courſe; and in two or three ſuch Courſes, if well dried, the Malt will be trod enough; that is, all the *Come* will be rubb'd off; and if the Malt be to be kept long, it is thrown on a Heap in the Duſt; but if it be to be ſold in two or three Months, the Duſt is immediately ſeparated, by running it through a Fan or Skreen, that it may take the

Air better in the Heap, and become more mellow, at the ſame time it is cleanſed. *N. B.* This Method of Treading is not always uſed.

There are Brick and Stone-Kilns for the Drying of Malt: And all the Floors for the Working of Malt are made of Plaiſter, which are much better than thoſe of Mud, Lime or Boards; but Boards, I take it, make the beſt Flooring of the Granary for the dried Malt.

Some think 'tis beſt to grind Malt Four or Five Days before 'tis brewed, (but that is much controverted;) and ſome Perſons would have it double that Time, and the Water Five or Six Days in the Veſſel before uſed. There is hardly a County where there is not ſome good Beer and Ale made; but *Derby*, *Nottingham*, *Dorſet*, *Burton*, *&c.* are moſt eſteem'd. Indeed all the *Northern* Counties much exceed thoſe of the *South*.

Malt, if it be burnt, is not only of a brown reddiſh Colour, and ſmells of Fire; but alſo yields very little Quantity of Liquor, and that with a high Colour and ill Taſte; which generally, if not always, go together.

There are ſeveral Methods and divers Materials uſed for the Drying of Malt. In *Hampſhire*, 'tis generally dried with Wood or clear Billets; which at beſt gives the Malt an ill Taſte, and therefore is generally eſteemed the worſt Way. Another and the moſt common Way is, to dry it with Wheat or Rye Straw; which, if carefully choſen and uſed, doth very well and gives general Satisfaction. But the drying with Cowks has of late Years obtained the moſt univerſal Approbation, as having the leaſt Smoke, and conſequently leaving no ill Smell or Taſte, except it be overheated or burnt. Only ſome, who are not uſed to it, complain it makes the Drink *heady*, and leaves a *Clammineſs* in the Mouth. There have been ſome Contrivances of late of drying Malt with red hot Iron Furnaces; but if the Weather and Seaſon of the Year would countenance the Practice, the drying it in the *Sun* ſeems beſt and moſt rational, *that* being the pureſt and cleanneſt Fire. And it hath accordingly been practiſed in ſmall Quantities by a Clergyman in *Northamptonſhire* with great Succeſs; from whom we have been made to hope and expect a learned Treatiſe on the Subject. As to the Complexion of Malt, *White* is undoubtedly the beſt, becauſe moſt *natural*; for in all Preparations and Operations all Endeavours ſhould be uſed to maintain the *natural* Complexion of the Thing; for the Tinctures ariſe and proceed from the fine Spirits and Eſſential Virtues: Wherefore in the Order of making Malt, if the Colour be altered, its Virtues alſo are changed, and the Drink is made of another Nature and Operation, and often proves injurious to the Bodies of Mankind; from whence we may certainly conclude, that the *whiter* the Drink is, the better and more healthful, as having milder and gentler Operations.

I think it is univerſally agreed, that the leſs Smoke there is in the drying of Malt, the better; becauſe every degree of Smoke gives a Taſte by no means agreeable to the Palate, except of ſuch Ruſticks, who ſwallow it down almoſt without Taſting, and judge of the Goodneſs of Drink by the Deepneſs of the Colour, and its intoxicating Effects. Wherefore for the Sake of ſuch, common Brewers are wont to heighten both by *Scorching* the Malt, and *Lanting* the Drink in working, *i. e.* throwing in now and then a Chamber-Pot while it is working.

But, (except with ſuch polluted Palates as theſe) the Art both of Malting and Brewing is at preſent brought to great Perfection in *England*, chiefly in the *Northern* Parts; and *Engliſh* Beer and Ale are earneſtly ſought for and greatly admired in all Parts of the World. It is plain *Northern* Barley, if it is as good, cannot be better nor exceed that of the *South*; and therefore the Excellence of our Malt and Drink muſt be owing to the Method of making and drying the Malt without Smoke, by means of Cinders or Cowks made of Sea or Pit-Coals. For there are Brewers and Waters of all kinds both in the *North* and *South*. *London*, and all the Parts about it for Thirty or Forty Miles round have been a long time infamous for the worſt Drink, and famous for the beſt Bread: And all on the *North* Side the *Trent* juſt *vice verſâ*. But of late Years, Wiſdom and Experience have taught both the *North* and *South* to mend their Errors, and to learn of one another; ſo that we begin to taſte good Drink in the *South*, and as good Bread in the *North*. But to return to the Buſineſs of Malting.

Some of late have covered their Kilns over with Wire inſtead of Hair-Cloth, which is a Way much to be preferred: For this doth not only dry it ſooner, but doth it much cleaner and ſweeter. By means of this Grate, the unſavoury Properties and Particles of the Fire paſs away more freely, and the refreſhing Sweetneſs of the Air is not ſo much hindered from circulating, and conſequently leſs Humidity is contracted: Whereas the Cloths are thick, and retain the Sulphureous Vapours which are ſo injurious to the Malt. This is manifeſt in all ſuch cloſe Places, where Stoves are; the Air having no free Circulation, becomes very noxious and unwholſome.

It hath been generally thought (as I have already obſerved) that to make the *beſt*, the *ſtrongeſt* and the *moſt* Drink, the Malt ſhould be ground Two or Three, nay ſome ſay Seven or Eight Days before it is brewed, to *mellow* it, and make the hot Liquor penetrate all the Parts of it. But as that ſeems to be a Reaſon of no weight; ſo others think, that the Injury which the Malt ſuffers by ſtanding *ground*, is too great to ſuffer a bad Cuſtom to continue. The outward Coat of the Malt is its natural Covering, to retain the fine ſpirituous Parts and inward Powers not perceptible to the Sight; therefore if by an undue Order or violent Method they are let looſe, theſe ſpirituous Qualities, according to the Degrees of the Injury done, will evaporate inviſibly; and then the Body, be it what it will, becomes ſick, and by degrees will languiſh and die. The Caſe is the very ſame with Beer or Ale warmed at the Fire to make it briſk and ſparkling; which yet, after it is *ſet by* Two or Three Hours, will loſe its Spirits and lively Qualities, without having loſt any of its Meaſure.

The like is to be underſtood of all other Things that have paſſed thro' any Digeſtion and Fermentation, as Malt hath, whoſe Body is throughly opened. Therefore if it be *ground* long before it is uſed, it is thought, by this way of Reaſoning, the ſpirituous Parts and beſt Virtues will evaporate. But ſtill a nice Obſervation and long Experience muſt determine this Diſpute; one ſide whereof ſeems, as above, to be ſupported by good Reaſon and Philoſophy.

It ſeems to be agreed by all, that grinding Malt too fine is a great Fault, and yet to be ſupported chiefly by the Reaſoning above, that the Spirits of the Malt evaporate; neither will the Drink be ſo clear. The modern Contrivance of, not *cutting* but only, *ſqueezing* and *bruiſing* the Malt between two Cylinders, (if the Skins of every Corn were ſure to be broken) ſeems right and rational. But the Brewing of Malt, without either grinding or bruiſing, can be rationally practiſed but once, except a greater regard be had to a Dainty for the Hogs, than to the Strength and Goodneſs of the Drink.

Of CATTLE, *ſuch eſpecially as are moſt uſeful and profitable to the Farmer.*

EVERY one knows the Uſefulneſs of *Horſes* and *Oxen* for the Huſbandman and Grazier's Purpoſes; and the Choice of them being generally ſo much better underſtood by Practice and Experience, than by any Directions that Theory-men can poſſibly give, I ſhall think my ſelf entirely excuſed ſaying any thing further on this Head, than juſt what I ſhall think neceſſary to introduce ſome Particularities and ſhort Notices that have happen'd to fall in my Way.

As to *Horſes* in the Uſe of Huſbandry, and to make Profit and Gain of them, I cannot but recommend the Practice of many Places in *Northamptonſhire*, where they buy them in Colts at Spring from *Leiceſter* or *Nottingham* (the great Breeding Countries) at Two and Three Years old, teaching them to *hang* in the Geers, and uſing them for the more gentle Works, and leſs ſevere Service for a Year or two, and then ſell them out again at the Fairs at *Northampton* for the Uſe of Gentlemens Coaches for Twenty Pound and Thirty Pound, and ſometimes Forty Pound, according to their Goodneſs. And this is their yearly Practice, with reſpect to both Geldings and Stone-Horſes: By which the Huſbandman, if he be wary and careful in his Choice, makes a very conſiderable Gain. But there is Diſcretion and Judgment to be uſed in every thing. They uſe them, as I ſaid, *gently*; and tho' perhaps in *Harveſt* and *Seed-time* and *Fallowing*, they are always doing *ſomething*; yet the diſcreet Huſbandman ſo contrives it, that theſe *young Ones* ſhall rather *play* than *work*, having always Two or Three Drudges and Slaves (perhaps Blind or Old) on which the Burden and Chief of the Work muſt lie.

The greateſt Misfortune that attends theſe heavy Horſes bred up for the Coach is, that they ſometimes, too often, fall *blind* of one or both Eyes, either in the Farmer's or the Gentleman's Hands, at Three or Four or Five Years old; ſeldom later. The Reaſon of which, ſome attribute to the high and hot feeding on Beans, Peaſe, *&c.* But thoſe who are more experienced ſeem to think the Misfortune is to be aſcribed to *blind* Mares and *blind* Stallions, ſo frequently kept for the Purpoſe of Breeding; that Weakneſs and Defect being very eaſily to be ſuppoſed transferrable to their Off-ſpring. Which hath frequently made the Farmers wiſh (and with reaſon to) that an Act of Parliament was made againſt keeping blind Mares and Stallions for Breed.

Oxen are no leſs uſeful to the Farmer for his Draught; and there are ſome peculiar Advantages attending *them*, more than Horſes. They are eaſier kept. And if they prove either lame, or old, or blind, by Working, there is little or no Loſs in them: For they will then feed as well, and afford as good Meat as a young one. Their Harneſs and Shoes are cheaper, as well as their Feed, becauſe they eat no Oats: Neither are they ſubject to ſo many Diſeaſes as Horſes are; tho' heating them, and putting them beyond their ordinary Pace, ſometimes puts them into Surfeits and other Diſtempers.

The uſual Time of putting Oxen to work is at Three Years old. The firſt Year they ſhould be gently uſed, eſpecially in hot Weather: And then their Meat ſhould be good Hay, which makes them endure Labour better than Graſs, that makes them faint and foggy. Uſed with Diſcretion, they will continue to work till they are Ten Years old. And then it may be adviſeable either to ſell them, or fat them with the After-marth till *Chriſtmas*. The beſt way to rear up young Oxen for the Yoke, is to couple them with old ones that are gentle and well-trained: And if they are unruly (as ſometimes they will be) they ſhould be kept hungry, and uſed to eat Hay out of your Hand. Gentle Uſage with theſe ſlow and dull Creatures is beſt; for *that* is obſerved to bring them to the Yoke better than even *repeated Severities*.

The Uſe and Profit of a *Cow* to a Farmer is ſo conſiderable, that no Pains or Charge can well be too great for the procuring a good Breed. For which purpoſe a well-ſhaped *Bull* ſhould be choſen. Thoſe that are curious ſay, he ſhould have a broad and curled Forehead, long Horns, fleſhy Neck, and his Belly long and large. But of late Years, and eſpecially in the *North*, the *Dutch-Breed* is much ſought after and coveted, which have *ſhort Horns* and *long Necks*; and they are purchaſed at very dear Rates. Some for Fancy (which alſo much governs the Price of Horſes) will give Twenty Pounds for a Cow of this Breed; ſeeing, as they imagine, ſuch Beauties and Excellencies in them, that they cannot be bought too dear. But this is not, at leaſt ought not, to be the Rule and Method of the Farmer, who is to value and purchaſe Things for their real Worth and Uſe. And I confeſs I could never yet ſee that theſe Kinds turn to more Profit, than our *Engliſh* Kinds when they are well choſen. Beſide, there is one thing further, which (as I have been told by a very skilful Farmer) very much depreciates this Kind, and leſſens its Value; and that is, that the Tanner will not give near ſo much in Proportion for their Hides; becauſe they are much thinner and lighter. So that upon the whole, I can ſee no reaſon why a Farmer ſhould purchaſe imaginary Beauty at a dear Rate; or to ſet it in the Language of the Proverb, why he ſhould *go further to fare worſe*.

The *Cow* is uſually leſs than the Bull of the ſame Kind; but there are of all Sizes, and ſo fit for all Paſtures; and amongſt them a great many ſmall ones, which are hardly worth the Keeping: But the Encouragement is, the many pernicious Commons we have, which for the Fluſh of Milk in a few Summer Months, makes the Poor buy Cows to ſtarve them in Winter, and to ſpend ſo much Time in running after them, as would earn twice the worth of their Milk by an ordinary Labour; whereas, if the Commons were incloſed, ſome would feed them well all the Summer, and others would yield Hay for them in the Winter; whereby there would be always a tolerable Plenty of Milk, from which would ſpring many more conſiderable Dairies.

Cows are ſometimes uſed to the Yoak; and I have been told, that in ſome Parts of *France* they are ploughed with, and in *Barbadoes* Coaches are drawn with them. Some Cows are kept only for Nurſes, as in *Lancaſhire*, and in ſome Parts of *Eſſex*, and wherever fatting of Calves is a Trade. It is a Practice for Graziers near *London*, to go into the Country

try, and give Four Five or Six Pounds for a Cow with Calf within Two or Three Months of Calving, and to ſell off the Calves at One or Two Days old, for Seven or Ten Shillings each, to ſuch Perſons as make a Trade of fatting them; then they keep the Cows ſo long as they will give Plenty of Milk; but when that ceaſes, they fatt and ſell them off.

Moſt Countries, if they will, and have good Store of Feed for them, may have Plenty of Cattle; for moſt Cows, if kept ſo long, have a Calf a Year, from Three to Twelve Years old, ſometimes more; ſo that here is a Poſſibility of encreaſing Eight or Nine for One: And ſuppoſing only Three or Four Females, how many they will amount to in a few Years, muſt be left to Arithmeticians. Some Cows have often Two or Three Calves at a Time; for at *Stapleford*, near *Epping* in *Eſſex*, a Yeoman had a Cow which brought at one Time Three Calves, which were ſold to the Butchers for Nine Pounds.

And Dr. *Plot*, in his *Hiſtory of Staffordſhire*, tells us, that a Perſon living at *Dunſtal* in that County, had a Cow that brought Three Times together Two Calves at a Time, and the third Time Three Calves; ſo that ſhe had Nine Calves in Three Years Time: And that another Dairyman of *Wombourn* had a Heifer that at Two Years old brought him Three Calves, then Two, then Two more, and at laſt Three again, having Ten Calves in the ſame Time. He alſo tells us of a Cow-Calf at *Cannal*, that had a Calf Three Weeks and ſome odd Days before ſhe was Twelve Months old; and of another at *Wolverhampton*, a Fortnight before a Twelve-month old. The chief Uſe that Cows are kept for, is their Milk.

The *Calf*, whilſt alive, is of no manner of Uſe; but when killed, is profitable. The Manner of Fatting them, is generally pretty well underſtood. I am inform'd that there come from *Rumford* in *Eſſex* to *London*, weekly, ſeveral Carts or Waggons, bringing, one with another, about Twenty Calves each: Theſe Calves are brought from great Diſtances round *Rumford*, and a great many of them from *Suffolk*; I think I have heard from *Norfolk*.

Beſides theſe, are brought from *Malden*, and other Places in *Eſſex*, near the Water, a great many each Week. From Places between *Rumford* and *London*, Calves are brought to Town on Horſeback, and here ſell for Two, Three, Four, or Five Shillings each, more than thoſe brought in Carts from *Rumford*; and the Reaſon is, becauſe they do not waſte as the others do. Calves are often ſold alive for between Three and Four Pounds a-piece.

In *London*, when Calves are kill'd, the Butchers blow them; and ſome, when flay'd, lay them whole in Water, or wet Clothes, for ſeveral Hours, or whole Nights: The Blowing makes them look fair and large; the Watering white.

Without *Aldgate* there are ſaid to be fifteen Butchers, every one of which kills, one with another, Two Hundred Head of Small Cattle weekly, *viz.* Calves, Sheep, and Hogs, which amounts to upwards of One Hundred and Fifty Thouſand in the Year: And there are Six Butchers that kill each Six Beeves a Week, which is Thirty Six, and Eighteen Hundred Seventy Two the Year. And it has been computed, that in the City of *London*, upwards of One Hundred Thouſand Beeves, as many Calves, and Six Hundred Thouſand Muttons, are killed and conſumed in a Year.

In *Lancaſhire*, the Manner of *Breeding of Cattle*, is by turning two Calves to run or ſuck upon one old Cow, from about the Beginning of *April* until the End of *Auguſt*; and it is a good Way for Calves to ſuck ſo long; but where there is one brought up ſo, there are five brought up by Hand. Suppoſe a Calf to drop in *January*, *February*, or *March*, or later in the Year; when the Calf is a Week or Ten Days old, they wean it from its Dam, and teach it to drink by putting the Finger into the Calf's Mouth, and with the other Hand thruſting his Head down into the Pail, and then the Calf claſps his Tongue about the Finger as if he would ſuck, and ſo fetches up the Milk; and after a few Times thus doing, the Calf will drink on his own Accord with great Greedineſs: Which at firſt is good new warm Milk from the Cow, until the Calf be about a Month old; and then they mix a little Pottage (made of Blue Milk, Skim Milk, and Oatmeal) with ſome of the New Milk, and give it the Calf Blood-warm; and as the Calf grows older and larger, they give it more of the Pottage, and leſs New Milk.

Now this Way of Pottage is uſed moſt by thoſe that have but a few Cows, as Two, Three, or Four at a Houſe; or by thoſe which have more, as Ten, Twenty, Thirty, *&c.* who keep a Dairy; but their Calves drop in Winter, before they make Cheeſe, and ſo have no Whey to give them: Otherwiſe, if the Calf be Six Weeks or Two Months old when they begin to make Cheeſe, they give the Calf Morning and Evening a little Pail-full, containing about five or ſix Quarts, of good ſweet Whey, inſtead of the Pottage and Milk. And this Way of Drinking, (whatſoever the Mixture be, for ſome make it one Way and ſome another, and vary it at different Ages of the Calf) is continued until the Calf be Fourteen or Sixteen Weeks old, as they ſee the Strength and Good-liking of the Calf; and then the Calf is weaned and treated with Graſs in the Day, and good Hay or Hay and Straw in the Night, as the *Runner* is treated.

The Reaſons why they teach the Calves to drink ſo ſoon, are various: Firſt, if they ſuffer the Calf to ſuck too long on its own Dam, ſhe will not give her Milk ſo well after they are ſeparated for many Days, ſhe will mourn ſo much for the Loſs of her little one. Secondly, the Goodwife ſaves Milk by this Way of Drinking. Thirdly, the Perſons that would rear Calves, have no old Cows to turn Calves upon; and as ſome poor People that have but Two or Three Cows, yet thoſe can rear Two, Three, or Four Calves if they pleaſe, (for they commonly buy a fine Calf of a Neighbour of a Week or Ten Days old, and rear it, and prevent the Butcher of having it for Slaughter,) and ſo proportionably to the Cows, they may rear what Number of Calves they pleaſe: Some Perſons will rear above Twenty Calves on one Farm in a Year. Fourthly, by teaching the Calf to drink, they have not only the Cow ready for the Dairy, but ſhe is alſo fit for Bull in a convenient Time, (which is a chief and principal Thing in Dairy,) and ſo they have the Service of the Cow again the next Year, which they cannot have of that Cow on which two Calves ſuck till *Michaelmas*: And theſe Calves at a Year, or Two Years old, are treated like other finer Breed.

As to the Uſe of the *External Parts* of Kine, the Horn is uſeful to many Purpoſes; as, to make Lanthorns, Hafts for Knives, Combs, *&c.* They make Walls, the hollow Spaces between them being fill'd up with Mud and Dirt; laid under-ground, they keep it hollow, where Draining is neceſſary; and a third Uſe of Horns is for improving of Land, if broke in ſmall Pieces, or burnt and ſtrewed upon it; for then it very much imbibes the Nitre of the Air, and ſo fertilizes the Ground.

Horn-Shavings are ſold for Eight Shillings and Six-pence the Quarter Sack; and five Sacks, if ſtrewed on cold ſtiff Ground, or ſcattered in Furrows before the Plough at *Michaelmas*, will very much improve Two Acres of Land, but do little or no Good to hot Ground. A Perſon inform'd me, that when he was a Boy, (and he is ſince upwards of Sixty Years old) he knew a wet cold Place of Six or Seven Acres of Land, that had Sixteen Sacks of theſe Shavings ſtrewed upon it, and it brought Corn plentifully for four Years together; and then being laid, it brought forth very good Graſs, and continues ſo ſtill. The Saw-Duſt of Horn mixt with Mould, is an excellent Compoſt for the raiſing of Flowers.

Hair of Kine will produce Oil, Spirit, and all Things that Horn will for Uſes phyſical; and by Reaſon of its Thinneſs, it fertiles Land ſooner than Horn, unleſs finely raſpt. It is good alſo to keep Mortar together for Walls; and by Spinning and Weaving, it makes Cords and Cloths.

The Hoof is of the Nature of Hair and Horn, both for Phyſical Uſes, and Improvement of Land; but the Hoofs are chopp'd into ſmall Pieces, and ſow'd on dry Ground, which makes it very fruitful for Three Years; and ſo again, if repeated. This Cuſtom, with Horn, Hair, Hoofs, and Rags, reaches ſeveral Places, and much to their Advantage.

The Hoofs are ſold from Twelve to Eighteen Pence the Buſhel, and are often ſet on Sticks in Gardens to catch Earwigs, where they are of great Uſe to the Floriſt.

Having ſaid thus much about Cows, and given ſome Directions to the Farmer for chuſing and managing them; he will, I hope, now excuſe me, if I ſay ſomething of the Nature of Milk, tho' it be in a more phyſical and philoſophical Manner.

Of Milk.

MILK is a refined Liquor, free from divers groſs Parts, and ſent forth from the Blood in the Breaſts or Udder; where, by Means of its oily, wateriſh, and ſaline Parts, and a great Working or Straining through many Paſſages, it is reduced to a Whiteneſs; and ſometimes by an over-great Plenty, or Weakneſs of the Teats, runs forth, and at other times is emptied by ſucking or preſſing the Parts; which cauſing a kind of *Vacuum*, it is ſupplied again by the Preſſure of the Air.

This Milk (in Beaſts) is compoſed of Butter, Curd, and Whey; and they have not only an Alkalizate, but an Acid Salt, as it is ſeen at firſt by Milk turning with an Acid, and by its own Acid it is exalted. It is the Food that Nature provides for the Support of the Young; and indeed it is well adapted to that Purpoſe; for by its Warmth when ſuck'd, it comforts; by its Oilineſs, it enables the Parts to be extended; and it greatly adds to Nouriſhment: By its *Caſeous* Parts, it adds to the Solidity; and by its *Serous* Parts, it ſerves as a River to carry the reſt. It cools and furniſhes Matter for all watery Evacuations.

If it be thus with Young, why ſhould it not agree with Elder Ages? It is a Maxim, *Quo res acquiruntur retinentur*; *Things are maintained by the Ways they are attained.* But I muſt confeſs, when Men are grown up, it may be very convenient to have more ſolid Food; and the Reaſon of it I take to be, becauſe Milk muſt be taken in great Quantity, and by Reaſon of its Thinneſs it ſpends quickly, and the Man wants a Supply ſooner; and if he labours hard, he may ſpend his finer Parts, and the other may coagulate the Milk the ſooner: Therefore Fleſh, Butter or Cheeſe, which are made of Milk, and are their chief Parts contracted into a greater Cloſeneſs, and much more portable, and that will keep longer when dreſs'd, may be more proper for him: And the Reaſon why one Meal a Day ſerves many Men, is becauſe it is Milk, Juice of Plants, or other moiſt Meats contracted, and expanded again with Water or other Liquors; and commonly ſuch Men uſe not Labour or other Exerciſe to ſpend themſelves, ſo much as great and painful Workers, who are obliged to eat often in a Day; for according to the Expence muſt be the Supply, or elſe we waſte our Fleſh, and reduce our ſelves to Leanneſs.

But a great many complain of Milk, and ſay it is phlegmatick and ſtopping, and conſequently not ſo wholſome for Men to eat: Tho' this I take to proceed from much Wine and Drink, ſalt Meats and ſour Sauces, which many Perſons are fond of, and which debauch the Stomach, and cauſe ſo much Acidity there, as will turn the Milk over-haſtily, and make it into thick and hard Curds; even ſo thick, it is vomited up as it were in long Ropes. The like may be ſaid of ſome emaciated People. But this is not the Fault of the *Milk*, but of deprav'd Stomachs; and if they would leave their ill Habits, and accuſtom themſelves to this by a little and little at a Time, it will by degrees deſtroy the Acid, bring all to a good Temper firſt, and then nouriſh and fatten.

By being *Phlegmatick*, I ſuppoſe is commonly meant, that it is viſcous, ſticking together like Phlegm or Spittle; and when *Milk* is drunk raw from the Cow eſpecially, there will be often ſome ſuch like ſpit up; but theſe do not conſider that it goes not thus into the Blood; it is curdled and ſeparated, the thick from the thin, before it comes there, and ſo it cannot ſtop the Veſſels any more than ſolid Food can. In ſhort,

Milk, uſed with Diſcretion, is *Meat*, *Drink* and *Medicine*: It is ſo agreeable to Animal Temperaments, that in all likelihood the great Uſe of it was one Cauſe of the Longævity of the *Patriarchs*; and we generally find, that where it is moſt in Uſe, there are feweſt Diſeaſes and Phyſicians.

It is dreſs'd various Ways. It is thicken'd with Flower, Oatmeal, *French* Barley, Rice, Eggs, *&c.* and of late with *Sago*, which is ſaid to be the Pith of the Palm-Tree brought from the *Eaſt-Indies*, and uſed as a great Reſtorative. As for Phyſick, it is uſed in as many Caſes: Inwardly, it often cures Conſumptions, and ſeveral other waſting Diſtempers; eſpecially the Milk of the Aſs, which is found by Experience not to curdle in the Stomach; nay, will not turn to Curd, tho' you pour Vinegar on it while it is warm. Outwardly, Milk is very good for ſore Eyes; in Cataplaſms it will ripen and break hard Swellings in the Throat, or ſeveral other Parts, if made with Flower, Oatmeal, *&c.* From the ingenious Mr. *Evelyn*, I have heard it commended for a great Eaſer of the Gout, if enough be warm'd, and the Legs ſet up to the Knees in it, and continued there 'till warm. Milk and Water is a common Waſh for the Face, and a common Drinking in the Summer Seaſon. It is greatly uſed with *Coffee*, *Tea* and *Chocolate*, and by the Vintners in their Wines; and is one of the moſt univerſal Suſtenances Mankind knows.

Some have a great eſteem for *Water* diſtill'd from *Milk*, either of itſelf, or with ſeveral other Ingredients; and this is commonly or conſtantly done in Alembicks, or a common *Still:* But, beſides what riſes from the Ingredients, I can ſee no Advantage more than if it were diſtill'd from fair Water; for *Milk* is an Animal Matter, and nothing will ariſe from thence but the watery Parts of the *Flegm* or *Serum*: Neither will the Oil from the Buttery Part of the Milk, nor the Earth or Salt from the Cheeſy Parts ariſe in ſuch Heats; of which I am well ſatisfied from the Nature of it as to its Animal Subſtance.

Of Butter.

At *Over*, near *Cambridge*, they keep a middling ſort of Cows, ſell many off at *Michaelmas*, and buy others that will Calve each Month of the Winter, that they may have Butter enough to ſerve the Colleges; and by Hay-feeding, they have almoſt as much Butter in Winter as in Summer; and as Sweet and as Yellow (for New Milch Cows make Yellow Butter) as uſually others have in *April*; and the Butter of this Town is commonly ſold for at leaſt a Half-penny the Pound more than other Towns ſell for, and the Curious always enquire for *Over-Butter*.

In *April*, when the Cows go firſt to Graſs, about Twelve Quarts a Day, *Wincheſter* Meaſure, is good Milking for a New Milch Cow; and this, if well skim'd, yields about a ſixth Part or Four Pints of Cream, which will make almoſt Two Pounds of Butter. They Churn twice or thrice in a Week, pouring the Cream from the ſettled Milk into a clean Earthen Pot every Morning; which keeps it from ſowering, and makes it the beſt Butter, tho' not ſo much: And this Cream they put in the Churn about Sun-riſing, after they have milked the Cows.

In a great Dairy they ſometimes put into a Churn, about the Bigneſs of a Barrel, Two and Twenty Gallons of Cream, which fills two Thirds: This, with the Labour of a luſty Man and Maid, comes to Butter in about an Hours time, more or leſs; in hot Weather 'tis ſooneſt, in Cold Weather 'tis longeſt; but if the Cold be mended much by Fire, it changes the Butter in Taſte, Colour and Stiffneſs; but to be in a Room a Yard and a half diſtant from the Fire does well; and in very cold Weather they put boiling Water in the Churn 'till it thoroughly heats it, and that being taken out they put in the Cream. Theſe Twenty Two Gallons, or One Hundred and Seventy Six Pounds of Cream, yield uſually about Seventy Pounds of Butter; which is about Seven Parts in Eighteen.

Some Perſons Churn by help of a Sweep, which is a Thing like a Pump; others uſe Barrel-Churns, and reckon them beſt. One that keeps Sixty Cows in *Denny*, a Town not far from *Over*, has a Barrel-Churn that holds a Hogſhead, and is called a Hogſhead-Churn.

When the Butter is come, it is taken out and waſh'd, if for preſent Uſe, otherwiſe not; and with a little fleeting Diſh, it is drawn backwards and forwards in a Bowl, a little at a time, to let out the Butter-Milk, and then it is ſalted; a Quart of Salt, which is about the Fifteenth Part, will ſerve Thirty Pounds of Butter, but ſome put more or leſs; and when ſalted, it is drawn over again with a fleeting-Diſh once or twice; then weighed into Pounds, and rolled into long Rolls; when in hot Weather, it is put into a Basket and hung all Night in a Well, within a Yard or a Yard and a half of the Water, to make it ſtiff; and in theſe long Rolls it is carried to Market, and cut out and ſold chiefly for the Uſe of the Colleges.

The *Over* Butter will not keep ſo long as *Suffolk* Butter; but a famous Dairy-Woman that lived there, uſed to make her Butter in Balls of Thirty or Forty Pounds Weight, and ſalt it a little more than for Freſh

Butter, and this ſhe laid in the Middle of a Bin of Flower, and it would keep all the Winter. Others ſalt it as uſual, and put it into Pots, and cover it about two Inches high with good Brine; but this will not keep ſo well as the other.

The Butter-milk is drank by ſome Perſons, but the Dogs or Hogs have the Bulk of it; and if it ſtands long, it will turn ſour, and in a Weeks time from Five or Six Quarts will ariſe a thick Skin or Top, as thick as one's Finger; and under it will be a very clear bluiſh Whey, and at Bottom a thick Curd, but not like Cheeſe Curd. It is knotty and very ſlippery. Of this Butter-milk ſome poor People make Cheeſe, but it is very rough, and muſt be eaten while green or freſh: The Whey that comes from it is very thin, ſour and green, and the Hogs care but little for it.

In *May*, *June* and *July*, (when the Dairy-men chiefly make Cheeſe) they milk the Cows half, which they uſe for Butter: The other half or Stroakings they uſe for Cheeſe; and theſe Stroakings will yield moſt Butter and moſt Cheeſe, and leaſt Butter-milk or Whey.

In an indifferent Year, a good Cow will yield at this Time Sixteen or Eighteen Quarts in a Day; and if the Weather be dripping, ſhe will yield more, and Butter is made longer. In *Auguſt*, and ſo to *April*, they muſt make Butter both to ſerve their Cuſtomers, and becauſe in cold Weather Cheeſe will not be ſo good; otherwiſe Cheeſe turns to the beſt Account.

Sweet and new Cream will make very pleaſant Butter for preſent ſpending; but if the Cream ſtands till it is ſour, the Butter will be good and keep longer, provided it be not over-heated in the Churn; but if once it turns bitter, it is good to ſpend it preſently, for it will ſoon decay.

At the Fall of the Leaf, and in cold Weather, Cream will turn from Sweet to Bitter, and the reaſon is generally ſaid to be becauſe the Cattle eat the Leaves of Trees; but this has been contradicted, becauſe it will be ſo in low Grounds where there are no Trees, as well as in Uplands, where there are Trees: And what is the real reaſon of it, is hard to know till we have a good Theory of Taſte, which is difficult to be got and greatly wanting. The beſt way to prevent this Bitterneſs, is to ſet the Milk a leſs Time, and Churn it oftener; but this will produce but a ſmall Quantity; and it is beſt to ſell and ſpend it new, and not to pack it in Firkins; for it will not ſell in *London*, but the Traders are forced to ſhip it off to other Countries, where, by its Badneſs, it diſparages our own Products.

It is ſaid, if Salt Butter be well waſhed, and then beaten up with New Milk, it will taſte like Freſh Butter. There is commonly Four Shillings in the Hundred difference between *Suffolk* and *Northern* Butter, and ſometimes more; but it is not ſo much the fault of the Country as the Management: For if the Dairy People would be at the Pains to work it well, and get out the Butter-milk, the Butter would be firm, and both well coloured and taſted, as it is in moſt Parts of the Biſhoprick of *Durham*.

The *Iriſh rot* their Butter, and in hot Countries they *clarify it*; the Taſte of either of which pleaſes not thoſe that do not imitate them. The chief Uſe of Butter is for Food; and it is an excellent one, but of more Uſe in hot Countries and Weather than in cold: And in Medicine, Butter is good for all Things that Oil or Greaſe is. The *Dutch* Men ſay, it is good for every Thing but ſtopping of Ovens.

In *Devonſhire* they make a *ſcalded Butter*, much admired at *London* of late, whither it is ſent Weekly, tho' at ſo great a Diſtance: For therein conſiſts its great Excellence, that it will keep Three or Four Weeks, and eat altogether as well as freſh Butter. The Method of making it, is, Firſt, after the New Milk is ſtrained into clean earthen Pans, they let it ſtand for a Night, or Twelve Hours in the Day, removing it then very gently, and ſetting thoſe earthen Pans into another Veſſel made of Earth or Lead half full of Water, which Veſſel is fixed and ſet over Stoves with a gentle Fire; by which means there ariſes a thick clouted Cream, which is taken off with a Scumming Diſh of Tin full of Holes, thro' which the blue Milk paſſes and is ſeparated from the Cream; which Separation, when it is gradually and fully made, and the whole Cream put into a Pot, the Whole muſt be ſhifted every Twelve Hours till you have your ſufficient Quantity ordered as above; and then it muſt undergo the common way of *Churning* and *Salting* till it is made into compleat *Butter*.

In ſome Places they churn their Milk whilſt it is new and warm, conveying it in Pipes from the Cow into the Churn, where it is kept in conſtant Motion by an Horſe, till the Butter comes. Then they drain the Butter-milk off into another Veſſel, to which they put Runnet; and of this they make excellent Cheeſe for a Family. But tho' the Butter is good for preſent Uſe, yet it will not keep long.

N.B. The Proportion of Milk for one New-Milch Cow at *Over* as aforeſaid, was thought to be about Twelve Quarts a Day, and a large Quantity too; but in *Northamptonſhire*, the late Vicar of *Stanford upon Avon* told me himſelf, that he had a Cow (and no large one neither) going in his Church-yard, that yielded him, (not for One or Two Weeks only, but) for Two or Three Months, no leſs than Twelve Pounds of Butter every Week, and made tolerable Cheeſe for the Family with the Milk afterwards.

Of CHEESE.

THE Benefit and Advantage which Men and other Creatures receive by Milk, naturally prompted the Provident to lay up what they uſed not preſently; and its Uſe being univerſal, it was in Time cultivated and improved, and by Man's Invention rendered into *Cheeſe.* To tell all its Advantages, requires much Knowledge of others, and Experience of one's own: But the principal Aim being to make the oily Part of Milk the Butter, or the hard Part the Cheeſe, *keep*; it is found that the harder it is turned, the firmer is the Curd, to a certain Degree.

Therefore an Acid (ſour Thing) muſt be put into it; as, the Flowers of Thiſtles, or Artichokes, or rather Chardons; but the Maw of a ſucking Creature, Calf, or Kid, is moſt uſual; which cauſes the Milk to turn to a digeſtible Conſiſtence. Some uſe this Maw after it is dry, by ſnipping off a ſmall Piece at a Time, and putting it in a little fair Water or Sack, for twelve Hours before. Some pickle the Maw and dry it in the Smoke, and put the Cheeſe together while the Milk continues warm, or heat a Part and mingle it to warm the reſt. Remember, the Maw itſelf muſt not go into the Milk. But as it is the Practice of the *Spaniards*, ſo it ought to be of the *Engliſh* too, to uſe the dried Flowers of *Chardons*; which, as it is the cleanlieſt, ſo it is by much the beſt for turning the Milk into Curd.

Then, when the Milk is curdled, the meer dividing makes the Whey ſeparate, and the Curd ſink down; which muſt be put into a Veſſel, and thruſt very cloſe, and ſalted, and this to prevent Corruption, which requires *Running*, as all Change of Texture does; and the Salt diſſolving, makes the Moiſture ſo thin, as to run away; and when dry, it keeps all firm. Then the Cheeſe is gently preſs'd; and either ſliced and ſcalded, which makes it curdle yet harder; or only crumbled, to open it and let out the Moiſture: And then it is made up again, and preſſed yet harder to make it cloſe and even. Some ripen it in Dung, or green Herbs that will heat, or in Smoke that makes it ſoft, and fit for preſent Eating: Others keep it dry for many Years; and for *Duration* and *Nouriſhment*, no other Food equals it.

There are other Things which may be uſed for the turning of *Milk* into *Curd*, beſides what are above-mentioned, *viz.* the Seed of Carduus Benedictus, Ginger, the Juice of the Fig-Tree, the inner Skin of a Hen's Stomach, the Spawn of a Pike, *&c.* But the dried Flowers of *Chardons* are beſt, ſteept over-Night in Water and Salt.

From Whey, if ſet on the Fire, will ariſe Wild-Curds, by putting new Milk and ſour Butter-milk to it. When it is ready to boil, and when it riſes, the Curds muſt be taken off with a fleeting Diſh or Skimmer, (but a Diſh is beſt, becauſe the other is Braſs,) and then with putting in more Milk and Butter-milk, more Curds will ariſe. Two Quarts of Milk and ſo much Butter-milk, will ſerve for ſix Gallons of Whey. The Whey that is left when the Curds are taken off, is but a little better than the worſt from Butter-milk: But the good Butter-milk and the beſt Whey will fatten Hogs well, tho' ſome think Butter-milk doth Hogs no good.

An Account of *Cheſhire Cheeſe*, as made at *Nantwich*, is as follows: The Ground to feed the Cows on, is very good, where it uſually bears Plenty of Cowſlips. The Cows are of a large Size, broad-headed, and horned, and in their Prime at Six Years old. From the Milk of ſixty ſuch Cows, which yield about ſix Quarts each every Meal, is the beſt Cheeſe made, after the following Manner:

The Milk is ſtrained into a Cheeſe-Tub, as warm as they can from the Cow; to which is put about ſix Spoonfuls of ſtrong Rennet, and then it is ſtirr'd well with a fleeting Diſh, and afterwards cover'd cloſe with a Wooden Cover, made fit for it; and about the Beginning of *June* it ſtands Three Quarters of an Hour; but if very hot Weather, leſs Time, and then it will be *come*; after which it muſt be broke with a Diſh pretty ſmall, and then it muſt be ſtirr'd, gently moving until it is all come to a Curd; then it muſt be preſs'd down with the Hands and Diſh gently, leſt the Whey ſhould riſe over white; and when all the Whey is drein'd, and the Curd pretty hard, then it muſt be broke into a *Vat* very ſmall, and heaped up to the higheſt Pitch; and then preſs'd down with the Hands gently at firſt, afterwards harder, till as much Whey be got out as can be that Way, and yet the Curd be at leaſt two Inches above the Vat; otherwiſe the Cheeſe will not take Preſs, but be ſour, and full of Holes or Eyes.

This done, it muſt be put into one End of a good Flaxen Cloth, and covered with the other End; and then the Cloth muſt be tuck'd in with a wooden Cheeſe-Knife, that it may lie ſmooth, and yet keep the Curd quite in: Then this is preſt with a Weight of Four Hundred, or thereabouts; and let to ſtand thus from Morning about Nine till the Afternoon about Two a Clock, and then taken out, turn'd into a dry Cloth, and preſt again till about Six at Night; and then it is taken out, and ſalted well all over, and put into the Vat again to lie in it all Night: Then it is taken out, and ſalted again, and ſo it lies in a Tub or on a Dreſſer four Days, being turned every Day. This done, it is waſhed in cold Water, wiped with a dry Cloth, and carried into a Cheeſe-Loft to dry, where it muſt be turned and wiped every Day till ſold.

If the Salt be not well waſhed off, it will *give*, and make the Cheeſe always moiſt: And the Reaſon of Mouldineſs, Cracks, and Rottenneſs within, is the not well curing, *viz.* preſſing and looking after. The Way to make *Rennet*, is to take the Curd out of the Calf's Bag, to waſh and pick it well from Hairs and Stones, and to ſeaſon it well with Salt; alſo to wipe the Bag, and ſalt it well within and without, and putting in the Curd. All muſt lie in Salt for three or four Days, and then be hung up.

Here follows an Account of *Chedder-Cheeſe*: *Chedder* being warmly ſeated on the South-ſide of *Mendip* Hills in *Somerſetſhire*, is expoſed only to the South and South-weſt Winds; and has the Moors adjoining to it on the South, being a warm and fertile Soil for Paſturage, whereby *Chedder* is rendered famous for Cheeſe; and it has been long a Cuſtom there, as well as in ſome adjacent Pariſhes, for ſeveral Neighbours to join their Milk together, as occaſion requires, to make the ſaid Cheeſe; which is of a larger Size than ordinary, and contends in Goodneſs (if kept a due Time, *viz.* from Two Years to Five Years, according to its Magnitude) with any Cheeſe of *England*. The Sizes of the Cheeſes are generally from Thirty Pounds Weight to One Hundred Pounds. And perhaps this

Practice, when rightly conſidered, may deſerve Imitation in many other Parts of *England*.

To make *Angelot-Cheeſe*, take the *Stroakings* of Two or Three Cows, and ſet it with *Rennet*, when it is newly milk'd; and then when it is come, take it up with a Skimming-Diſh without breaking the Curd; and then fill by degrees a narrow high Cheeſe-Mote or Vat, continually filling as the Curd ſinks, till the Mote is full. If you would have the Angelot thick, the Mote or Vat ſhould be Six, Eight, or Ten Inches deep, divided from Top to Bottom into two equal Semicircles full of Holes, which are exactly fitted into another flat Cheeſe-Vat below alſo full of Holes, all according to the Size you deſire to have it. You muſt keep it continually filling for three or four Hours; then let it ſtand till Night, ſtrewing a little Salt upon the End that is uppermoſt, and turn it by opening the Semicircles; and then ſalt the other End, and ſo let it remain nine or ten Days without removing, leſt it ſhould crack and break: After this, keep it in a temperate Place, that it may dry by degrees. The proper Seaſon to make this excellent Sort of *Angelot-Cheeſe*, is in the Beginning of *May*, or rather in *Auguſt*. If you would have it fatter, add a fourth Part of Cream.

If Cheeſe be not well ſalted, it will be magotty; and an *equal* Salting is of great Advantage in the making of Cheeſe; for as *too little* cauſes Corruption of the Cheeſe, ſo *too much* alters its Goodneſs: And to lay Cheeſes all in Brine, a longer or a ſhorter Time, according to their Magnitude, or the Temper of the Weather, has been by ſome approved the ſureſt Way; but it is apt to make it ſtrong.

If Milk be ſet over-hot, or ſcalded in the Curd, the Cheeſe will be *bitter*; and the longer it is kept, the worſe it will be: If it be ſet over-cold, it will cut white, and eat harſh and dry when new; but it will improve by lying, and is beſt eſteemed of for *keeping Cheeſe*. One great Fault in Cheeſe, is its heaving; and this is moſt common where there is the richeſt Paſture, and after Rain. The beſt Way to help it, is by paſturing Sheep with Cows, that the beſt of the Graſs may be quickly eaten: Another Way to help it, is to ſalt the Cheeſes in Brine, and lay them on a cold Pavement.

From the aforeſaid Obſervations, it ſeems very reaſonable that it does thus chiefly in hot Weather, by reaſon of an over-great Fermentation, not only from the Heat, but alſo from the Briskneſs and Thinneſs of the milky Particles gain'd from the Luxuriancy of the Graſs; and without doubt, it is as convenient for Dairies to have cool Rooms in Summer, as warm ones in Winter. We ſee, by Multitudes of Examples, that Beer and other Liquors, or any thing that is ſubject to Fermentation, never prove ſo kindly in extreme as in temperate Seaſons. If any could find an Art to hinder the Buttery Part running into the Whey, it would be very acceptable to the Dairy-Maid.

There is yet another Sort of *Cheeſe*, well known by good Houſewives by the Name of *Water-Cheeſe*; which is made after the following Manner:

Take ſix Gallons of new Morning's Milk and one Gallon of Cream mixt together with ſix Spoonfuls of Rennet, (made after the foregoing Manner with *dry'd Skins*) and a *little* Juice of Marigolds. Stir theſe all together, well covered down in a Cheeſe-Tub. Let it remain very hard in *coming*: Then take a wet Cloth wrung from boiling Water, to be ſpread upon the Curd all over without breaking it. Lay your Hands upon it, preſſing it very gently; which you muſt continue to do till you have gathered with a Diſh all the *Whey* from it; which, if it prove right, will be like Rock-Water. This done, put two Gallons of boiling Water on the Top of the Tub among the Curd, there to remain about half an Hour. After which, take away again the ſame Water as clean as poſſible, which may be done by Cloths, and wringing them out. Then take a long Knife, and cut the Curd into ſo many Angles of the Circle, as that you may *turn* them without breaking, laying them in the ſame Places again with their Bottoms upwards. Then again pour One Gallon more of ſcalding Water upon the Curd, letting it remain Half an Hour; take the Water from it as before, cutting all the Curd into little thin Slices, laying the ſaid Slices in a Cheeſe-Vat with a Cloth in Beds one by another, cruſhing every Row with the Hands till the Whole is laid in. Then preſs the Cheeſe thus made, and let it remain ſix Hours. After which, take it out and turn it, rubbing Salt on both Sides, and round the Edges. Put it again into the Cheeſe-Vat, and let it ſtand preſſed all Night; and then it may be taken out and turned daily, as other Cheeſes, twice a Day upon Shelves.

It may not be amiſs to mention likewiſe the Method of making the *wrinkle-coated* latter-made Cheeſes, ſo univerſally admired by all the Lovers of Cheeſe, which yet ſo very few are acquainted withal. Two Gallons of new Milk will make two Cheeſes of a proper Size; and the Time of making them is in *Auguſt* and the Beginning of *September*, thus: To thoſe two Gallons of new Milk put a proper Quantity of *Rennet*, or rather the Water in which Chardons have been ſteept as before; and after it is *come*, break the Curd and gather out the Whey with a Diſh. Then laying a Cloth in a thin Cheeſe-Vat, put in the Curd with the Skimming-Diſh into each Cheeſe-Vat, not preſſing it with the Hands; but only when the Cloth is laid over it with a Board, lay about ſix or ſeven Pound Weight upon it for about four Hours: Then take it out, ſalt it and turn it, and put it in again for about ſix Hours more. After which take it out and lay it upon a Shelf, turning it twice a Day till it is ready to eat, which will be in about a Month.

But becauſe there is a ſort of Cheeſe of late Years become famous and much admired, as being really good in its kind, called *Stilton Cheeſe*, it may not be amiſs to ſpread the Receipt how to make it a little farther than Mr. *Bradley*'s Monthly Papers; where he tells us, it was communicated to him by a Friend that may be depended on. I hope the Receipt is more accurate and juſt than the Deſcription of the Place given us by Mr. *Bradley*: For *Stilton* is not in *Lincolnſhire*, but a great Way off in *Huntingtonſhire*; neither doth it ſtand on *high Ground*, but on a *Flat and Level* near the Fens. However, here follows the Receipt to make the Cheeſe.

Take Ten Gallons of Morning Milk, and Five Gallons of Sweet Cream, and beat them together: Then put in as much Boiling Water as will make it warmer than Milk from the Cow. When this is done, put in Rennet made ſtrong with large Mace, and when it is *come* (or the Milk is ſet in Curd) break it as ſmall as you would do for Cheeſe-Cakes; and after that, ſalt it, and put it into the Vat, and preſs it for two Hours. Then boil the Whey, and when you have taken off the Curds, put the

Cheeſe into the Whey, and let it ſtand half an Hour. Then put it in the Preſs, and when you take it out, bind it up for the firſt Fortnight in Linnen Rollers, and turn it upon Boards for the firſt Month twice a Day.

Good Cheeſe is fat and heavy, the Meat of it cloſe and compact, of Colour ſomewhat yellowiſh, ſweet to Taſte, pleaſant to Smell, and nothing Mouldy; neither yet full of Mites or Worms, and which is made of pure Cows Milk.

Cheeſe, as I have already obſerved, is a Food moſt nouriſhing; and the older (ſo as it be not decay'd) the better. We ſee that with Bread and Drink it ſupports the Laborious ſix Days in the Week; and is of great uſe for Armies. It is a Food that not only will keep, but may be carried good to moſt Parts of the World. In its Curd, or New, it is ſaid to eaſe the Pains of the Gout; and it is ſometimes uſed in Poultis's to divers Purpoſes. And it may very well be added, that the oldeſt and ſtrongeſt *Cheſhire* Cheeſe is excellent againſt Cholick Pains in the Stomach.

Of SHEEP.

SHEEP, wherewith this Kingdom abounds, producing the moſt excellent Mutton and the beſt Wool, there cannot be too great Care taken for their Preſervation. And theſe are liable to bad Diſeaſes, particularly the Rot; which is a ſort of Dropſy, and diſtinguiſh'd into two ſorts, the one call'd an *Aſcites*, and the other an *Anaſarca*.

An *Aſcites* is, when the Belly of any living Creature is very much ſwell'd with Water, gotten out of the Veſſels, Guts, Veins, Arteries, *&c.* An *Anaſarca* is, when the whole Body is ſwelled with Water, gotten out every where; and when it is only in the Legs, or ſome other Places within the Fleſh, it is a degree of this *Anaſarca*; or, as Dr. *Willis* defines it, it is a white ſoft Tumour of the whole outward Body, or of ſome of its Parts, yielding to the Touch, and leaving a Dent upon Compreſſion.

This Water, in both Diſeaſes, is of the ſame Quality, *viz.* it is of the ſame Nature of the Urine, and *Serum* of the Blood; and, I preſume, the Water gets out of the Veſſels by ſome ſuch Way as the following: The Veſſels, as alſo the Skin and Bladder, are made as if it were of Threads faſtened together, by which means there are abundance of Pores, which, in an healthful State, are tolerably filled up with the *Serum* of the Blood; altho' not ſo cloſe, but that ſome of the thinneſt Parts, according to the Degree of Heat, do tranſpire either inſenſibly or by Sweat, which with Warmth will thicken, leaving only the Threads of the Skins behind. When this thicken'd Matter is diſſolv'd, either by a ſharp Juice, and ſo the thick ſeparated from the thin, as it is in Milk with the help of Rennet; or an over-great Quantity of watery Matter is taken in, which waſhes away this gluiſh Subſtance, as we ſee it does in making Glue, Size or Gellies; or when Animals are almoſt ſtarved, and ſo waſte this Matter, which I take to be the thing that nouriſhes us; which is often the caſe of Sheep in time of Rot, with the addition of eating more cold watery Food than at other times, which Moiſture waſhes away that glutinous Part that was left; it is no wonder if the Water ſoaks through the Pores of the

Veſſels, and ſo having no Paſſage to run away, cauſes that Swelling we call a Dropſy, and makes all the Fleſh thus affected to be wateriſh and flabby.

Beſides the Deſcription of the two ſorts of Dropſies above-mention'd that Sheep are ſubject to, there are ſome ſtrange Symptoms of ſuch Diſeaſes; that is, ſuch Sheep have often found in them a ſort of broad Worms, like unto the Fiſh we call *Plaiſe*. But how theſe ſhould get thither will be hard to determine: Some think they are bred there by Æquivocal Generation (without any Parent) which others will not allow, but think their very ſmall Eggs might be carried there by the Chyle and Blood, and there hatched or enliven'd when fit Matter comes to make corrupted Nutriment fit for them; as it is with Seeds lying ſtill in dry Ground till Rain or Muck comes; or Fly-blows, till the Meat is putrified, and made fit Nouriſhment for ſuch-like Creatures. Another Symptom is *ſpotted Livers*; which it is poſſible may alſo be the Effect of Worms, or at leaſt an Obſtruction and Ferment made from the aforementioned ill Juice.

To prevent all this, I would propoſe that the great Quantity of Water be prevented, by driving them, in wet Seaſons, to the drieſt Places they can, or to Salt Marſhes; that, as I am told, purges away the over-great Moiſture as it comes, and ſo leaves them in a tolerable Tightneſs; or, to give them Hay, Beans ground, or ſome other dry Matter, that may hinder the Wetneſs of the Graſs from doing Miſchief. I have heard of one in the *North* of *England*, that daily gave each Sheep a Bit of an Oat-Cake with good Succeſs; and it is not only neceſſary to take good Care of their Inſides, but alſo as much as may be to keep them dry without; a Way to do which is much uſed in the *Northern* Parts of *England*, and is as follows:

Between *Michaelmas* and *Chriſtmas*, in *Yorkſhire*, *Durham*, *Northumberland*, *&c.* the Farmers and Graziers fetch in all their Sheep they can find, from their Hills and Mountains, which are extremely wet, Winter and Summer; and having brought them into the Incloſures, they *greaſe* them after this manner: He that hath a Flock of Sheep of Five or Six Hundred, buys at the Time of Year Thirty or Forty Gallons of *Tar*, which he puts by Five or Six Gallons at a time into a Kettle or Pan over the Fire, firſt putting in about Twenty Pounds of *Butter*; and ſo lets them melt, and by ſtirring be incorporated together, adding ſome *Salt* to it. With this Mixture, taken from the Fire and well beaten together, he greaſes his Sheep; opening the Wooll by Plats, greaſing and chafing it into the Pelt or Skin of the Sheep, till he has greaſed him thus all over. A good Man-greaſer will greaſe Twelve Sheep a Day: And if they are not thus greas'd, they will not live Three Years, but will die of the Rot, and being Pelt-beaten; ſo that the Wooll will drop from their Backs of itſelf.

I preſume the reaſon of this *Northern* Uſage is, by *Imbalming*, to preſerve the Sheep from the *Wet* as well as the *Cold*: And I am told, that in *Rumney* Marſh in *Kent*, in the Time of extream hard Froſts the Sheep have been ſo benumb'd with Cold that they could hardly ſtand, but did kneel to eat their Food, which numb'd them farther; but by rubbing their Legs with *Tar*, (which is a good Balm to refreſh the weak Parts, and help on the Circulation of the Blood when it is almoſt coagulated) they have been recovered of their Numbneſs.

From what has been ſaid, we may be eaſily directed to the Method of Curing the Rot in Sheep, *viz.* That the Blood may be reduced to its Tone, and the Water gotten out of the Veſſels may be evaporated; the likelieſt Way to do which, is as follows: If not too far gone, by having the Parts ſo ſtretched, that the Quality of contracting is gone, as it is with an old Rope, that has been much ſtretched and uſed, and can never ſhrink up again, and be ſo tight as a new one will; and by having the Quantity of Water ſo great, that the good Blood and Humours from it is overmuch cooled, and as I may ſay drowned in it; In which Caſe, altho' by a great deal of Care and Coſt, more poſſibly than the Sheep may be worth, it is probable Life may be preſerved, yet it ſeems to me unreaſonable to expect a Cure. But before it is arrived to this Pitch, and being taken in the Beginning, *Vomiting* or *Purging* is very often ſucceſsful. For the firſt, in *Cambridgeſhire* they take three Buſhels of Chamber-Lee, and mix it with one Buſhel of Bay-Salt, and give the Sheep, faſting from the Fold, each a Horn full, or a little above a Quarter of a Pint; upon this they are obſerved, all of them, to bring up from their Stomachs vaſt Quantities of yellow viſcous Matter. And this Experiment need be uſed but once as nigh the Time of taking the Rot as may be.

As to *Purging*, there may be ſeveral Things uſed; but I am told that the Salt Marſhes will do it effectually, and ſo cure them, for which reaſon they are ſo much celebrated; but where theſe *Marſhes* are not, I like the *Cambridge* Medicine: And it ſeems to me reaſonable, that it ſhould be better than Purging, becauſe the Convulſion that Vomiting makes, may not only *empty* that which would over-moiſten, but by its Force, ſometimes *preſs out* ſome of the abundant Water.

After Evacuation the Parts muſt be ſtrengthened, which is done by dry Meat, and warming hilly Food; and without doubt would be much help'd, if *Alkalies*, which deſtroy ſharp Humours and ſtrengthen the Blood, were given. For Men, are given Spirits of Harts-horn, Soot, Urine, Powders of Pearl, Coral, *&c.* too chargeable for Sheep; but burnt Shells of Oyſters, or any other Fiſh, Egg-Shells, burnt Bones, and ſeveral ſuch like, given them as much as will lie on a Half-Crown, made up with any Thing in Balls, or given in any Liquor for Three or Four Mornings before the Sheep go from the Fold, will be no great Charge, and very much ſtrengthen the Parts: And the *Bay-Salt* being diſſolved in Urine, as above-mentioned, is fit for this reaſon, the Salt in Urine being an *Alkali*.

Mr. *Ward*, a Gentleman who lived near *Dartford* in *Kent*, when he perceived the Rot or Dropſy in his Sheep, uſed to make a ſtrong Decoction of Tithymale, and give the Quantity of half a Pint of it to each, which purged them very well; and in its Operation uſed to feed them with fine Hay: And he very ſeldom failed of Curing. The like Diſeaſe has been found in Cows, and other Cattle; near *Oxford* the Liver of a Cow was ſo much ſwelled with Water, that it weighed Seventy Six Pounds, and the Fleſh was tolerably fat, but flabby: And I preſume the Methods for Sheep, in greater Quantities, are good for theſe.

Dr. *Halley* informs us, that at *St. Helena* Sheep are very fertile, and commonly bring forth each Two or Three Lambs Yearly; but they are there very ſhort lived, dying of this Rot; which he takes to be the

Effect of the over-great Moiſture on their Hills; which are half a Mile high, and ſo moiſt, as Paper in the Night cannot be kept dry enough to write on. And there is no doubt but Greaſing, Vomiting, and what is aboveſaid, may be uſeful to preſerve the Sheep of that Iſland, as well as in our *Northern* Counties.

Sheep are on all accounts eſteemed juſtly to be the moſt profitable Cattle to the Farmer, not only for their Encreaſe, their Fleſh and their Wooll; but alſo on the account of the Manure they afford of *Dung* and *Urine:* which by good Husbands are preſerved in Places where Manure is moſt wanted, by penning them up and folding them a Nights. And in ſome Parts of *Glouceſterſhire*, they houſe their Sheep every Night, and litter them with clean Straw; which not only makes excellent *Soil* for their Land, but alſo makes the Wooll much finer. In *Middleſex*, and round about *London*, they buy a ſort of Sheep from the *Weſtern* Parts, which are wont to bring Lambs ſoon after *Michaelmas*; which, by being houſed and their Dams well fed, prove exceeding fat and white, ſo as to become a Dainty to the Great Mens Tables long before *Chriſtmas*; and care is taken to have a Succeſſion of them all the Winter: So that now there is hardly a Month in the Year, but you have fat Lamb in Perfection, and that at no exceſſive Price neither. Where there is a Demand for Lamb, it were eaſy to have it in other Parts of *England*. And this Dainty begins to preſent itſelf during the Winter even in the *North*; where indeed nothing is wanting in all the elegant Ways of Living. And this naturally encourages the Farmers to outvie one another in Diligence and Care, to furniſh the Markets with ſuch Curioſities as may draw out and circulate the Riches of thoſe who would *live ſumptuouſly every Day*.

Of GOATS.

THE *Goat* hath formerly been in much greater Eſteem, than it is at preſent in theſe *Weſtern* Parts of the World. The Fleſh is very ſtrong and rank; and therefore not ſo wholſome, at leaſt to be eaten in any Quantity: However, for the Sake of their *Kids*, or young Ones, which are by all allowed to be delicious Meat, they are well worthy the Care and Encouragement of ſuch Husbandmen as have Land and Conveniencies proper for them. They love and chuſe *Buſhes*, *Briers*, and *Thorns*, rather than richer Paſture. *Rocks* therefore, and the *Sides of Hills*, cover'd with theſe, and where it would be dangerous for other Cattle to approach, are beſt and moſt profitably ſtockt with *Goats*. The Bucks have under their Jaws two *Wattles*, or Tufts, like a Beard: And the Hairs all over their Bodies are long, and therefore are ſometimes ſhorn to make Mantles for Soldiers. Their great Heat and Luſt ſhould ſometimes be abated and corrected, by being kept low; otherwiſe they grow old in Six Years. They are very prolific; ſometimes a She brings forth Two, and ſometimes Three Kids at once: But if the Dam hath not Milk enough, they muſt be otherwiſe ſupported, for they will be made fat with a little Care; and their Profit is derived from ſuch Food as is worth little or nothing to other Creatures. As for the *Kids*, they are to be ordered in every Reſpect as Lambs.

Of SWINE.

ALtho' *Hogs* are the moſt hurtful, ſpoiling and ravenous Beaſts, and are in themſelves great Evils; yet they are almoſt neceſſary ones to the Husbandman; who otherways could make very little Profit of the Refuſe of his Houſe and Garden, and the Offal of his Barn. For which Reaſon, tho' they are greedy and voracious, and given much to root up the Ground and break Fences, yet the more Care muſt be taken to keep them rung or well yoked. There is a great deal of Art in chuſing a good ſort and right Breed. The Skilful ſay, a good Hog ſhould have a long and large Body, thick Thighs, and ſhort Legs; he ſhould be lave-eared, deep-ſided, and deep-bellied. Long-legged Swine deceive the Eye as well as the Butcher; the Colour is not very material, only ſome think the *pyed* the worſt, as moſt liable to the Meazles. The little black Sort with great Bellies have of late Years been introduced amongſt us, and are by ſome much admired for the Sweetneſs of their Fleſh, their quick and ready Feeding, and for the Delicacy of the roaſting Pigs. But yet, tho' Gentlemen, for their own Uſe and Curioſity, may think fit to indulge this Kind, yet their want of Subſtance makes them not the Farmer's Choice, nor for his Profit.

The largeſt Kind of Swine, as well as the beſt-ſhaped Breed, is to be found in *Northampton* and *Leiceſterſhire*, where they have them in great Numbers; eſpecially in the deep and clayey Parts of thoſe Countries, where there are great Crops of Beans and Peaſe, which feed them exceſſively fat; inſomuch, that ſometimes there will be found to be Forty Pounds of Fat upon the *Leaf.* But the Art of feeding a Hog well, is to give him only a little at a Time, and often. In woody Countries, they turn them looſe in *Autumn* to ſearch for Haws, Sloes, Pears, Crabs, and Nuts, but eſpecially *Acorns*; and after a Fortnight or Three Weeks, when they are glutted with theſe, they ſtie them up, and feed them with Peaſe or Beans; and ſome, with Flower of Rye or Barley made into a ſtiff Paſte, letting them never want Water.

Thoſe Farmers who live near great Towns, ſupport their Swine much by Grains of Malt from the Brewers. However, theſe only make them grow, but do not feed them. Hogs are great Lovers of *Lettuce*, even after it is run to Seed; as alſo indeed they are of almoſt all Greens out of a Garden, except Turnips; but neither the Roots nor Tops of *theſe* will they eat. *Carrots* alſo are greedily eaten by them; and the Roots of themſelves will make them fat. *Sweet Whey*, *Milk*, and warm Kitchen *Waſh*, every one knows will make Porkets fit for the Butcher in a little Time. The Waſhings of Hogſheads it is thought doth them more harm than good; but they will greedily drink it, and become thereby exceſſively drunk.

In the Management of Hogs, theſe Cautions ought to be carefully regarded: When the Hedges or Pyramids of Eugh are clipt, be ſure to diſpoſe of the Clippings, ſo that neither Hogs, nor any other Cattle, may come at them; for, upon eating them, they ſurely kill them. Let not your Hogs eat Man's Dung, nor Pidgeon's or Poultry's Dung, which generally bring the Meazles. And if you ſuffer them much to eat Carrion, Fleſh, or Garbage; it will but teach them to devour the Poultry, or at leaſt to be ravenous after young Chickens, Turkeys and Ducks.

In *Northampton* and *Leiceſterſhire*, where Bean-Stacks are plentiful, they contrive to ſet them near ſome Water, and ſo hedge them round in the open Field: To which Stacks of Beans or Peaſe, they turn in a proportionable Quantity of Swine, cutting the Stacks down at the Top as faſt as they eat the Bottom. And thus they live without any Attendance, by the Help of Water, till their Proviſions are conſumed, and they become fit for the Butcher, or to be ſent to *London* in Herds.

Of the RABIT *or* CONEY.

THE *Rabit* or *Coney* is of two or three Sorts; and all of them, with Management, Care, and Skill, become exceedingly profitable to the Farmer; who, if he would grow rich, is always to look about him, and in every Article and Circumſtance of his Farm, is to conſider *how* and *where* the Land may be ſtockt and improved to the beſt Advantage. Where then it ſo happens that there are any large *Waſtes*, *Heath Ground*, or *Barren Plains*, (eſpecially if the Mounds and Fences are not made with *live* Hedges,) *there* nothing turns to the Farmer's greater Profit, than to ſtock ſuch Ground with Wild Rabits; which, of all other Creatures uſeful in Life, are the greateſt Increaſers and Breeders.

Some Places are more ſingularly remarkable for the Goodneſs and rich Taſte of *Wild Rabits* than others; nor is it eaſy to aſſign the Reaſon of it. To be ſure their Goodneſs does not always attend the Richneſs of the Soil, but rather the contrary. A dry ſandy or gravelly Soil agrees generally beſt with them; but wet and boggy Ground is hurtful: for I cannot find that they are ever deſirous of Drink or Water; at leaſt, Obſervation always ſhews, that they do very well without it. The Rabits bred in the Park at *Aukland*, one of the Seats of the Biſhop of *Durham*, have been long famous and remarkably good; and yet they live amongſt the Deer and other Cattle. In other Countries you find ſome of the *beſt* on the moſt barren Ground, where a Sheep can hardly bite.

Becauſe their *Skins* at one Time of the Year in Winter are of more Value than their Bodies, I cannot forbear taking Notice of a Wild Rabit, whoſe Skin gives *Six Times* the Price of the ordinary dun-coloured Rabit, and whoſe Fleſh is deemed ſtill better too; and that is the *Silver-skinn'd* Rabit; much to be preferred therefore, and ought to be choſen by all thoſe who have it in their Power. This Sort is but of late Years introduced amongſt us; but now their Value and Profit makes them ſpread: for the *Furrier* every where makes great Demands for them; and I cannot find but they are as hardy and good Breeders as the other.

Tame Rabits of the ſeveral Colours, are not leſs profitable in their Way and Proportion than the other; but becauſe they are ſuppoſed to be under Confinement, and conſequently require a particular Care and Management, I ſhall add the following Directions. But firſt it is to be obſerved, that this little Creature begins to breed at leſs than a Year old, bears at leaſt Seven Times in a Year, (the Time of her Geſtation being only a Month,) and brings commonly Five or Six at a Time, going to *buck* again ſoon after ſhe has kindled; tho' it is a Miſtake to fancy ſhe *cannot* ſuckle her Young till ſhe goes to buck.

Their *Tameneſs* is eaſily effected, by Reaſon of their natural Love of Solitude and Retirement, continually ſeeking to hide themſelves in Dens and Caves of the Earth: But yet it is a Maxim confirmed by Experience, that the more they are confined and denied Enlargement, the ſtronger their Fleſh eats and leſs palatable. The beſt Way therefore, is to allow them a good large Place well walled in, and another Place well covered, to which they may reſort for Retirement and Shelter, from Rain, Dogs, and Cats, which are their greateſt Enemies; except it be the Buck himſelf, who, when they are much confined, will kill the Young Ones. To prevent which, the Female her ſelf, as ſoon as ſhe has kindled, will hide her Young, and cloſe up the Holes, ſo that the *Buck* may not find them; in which Tenderneſs and Care ſhe ſhould be aſſiſted as much as may be, by proper Materials, *viz.* Wool, Hair, and Rags.

The conſtant Food, which ought to be given to tame Rabits, both to preſerve them in Health, and to remove all Rankneſs of Taſte, is chiefly *dry Meat*, and not (as hath been ſo generally miſtaken) always *Leaves*, *Graſs*, and *Weeds*; which ſhould rather be given them as *Phyſick*, than conſtant *Food.* *Oats* therefore are unqueſtionably good for them. But becauſe it may be thought the Charge of ſuch Food will out-run their Profit; *Hay* of the *ſhorteſt* Kind and Sort is a very proper Food, and they will greedily eat it, and thrive upon it; eſpecially if it is ſuch as is made of *Clover* or *Trefoil:* One Load of which will ſerve Two Hundred Couple the Year round; which Stock will afford you Two Hundred Couple for the Family, and as many for the Market. It is very convenient to have little Cribs to put the Hay in, the Height of a Rabit's Reach, which will be a Means to prevent Waſte.

Not but that you ought, two or three Times in a Week, to give them an Armful of Thiſtles, Mallows, or other Refuſe of a Garden; which will tend to cool their Bodies, as well as help to nouriſh them in this moderate Proportion. However, there are Two Cautions to be obſerved, when Weeds and Greens are given to tame Rabits: *Firſt*, That the *Dew* be off the Leaves, before they are gathered and diſtributed. The not obſerving this Caution has been obſerved to cauſe the *Rot* in them, which is a Diſtemper they are ſubject to, and of which they frequently die. *Secondly*, that in cutting down Graſs and Weeds for them, you carefully obſerve there is no *Hemlock* amongſt them; for tho' they will eat it with Greedineſs, it is preſent Poiſon.

Every one knows the Method of taking wild Rabits by Ferrets and Nets; and therefore I ſhall add no more on this Article.

Of ſuch FOWLS *as are moſt profitable to the Farmer.*

THE conſtant Care and Art of the Farmer is to ſtore himſelf with all ſuch uſeful living Creatures, as may turn to his Advantage in the Market, and yet conſume little elſe but what would otherwiſe be loſt among the Chaff and Offal of his Barn and Stable. Of which kind are the known Fowls, *Hens*, *Turkeys*, *Ducks*, *Geeſe*, and *Pidgeons*. Theſe bring conſiderable Profit; ſome by their *Eggs*, others by their *Feathers*, and all of them by their *Brood* and *Bodies*.

Hen. The *Hen* is a very profitable Fowl: For with Care and Attendance one or other will lay Eggs and ſit every Month in the Year. The Winter Broods indeed are very troubleſome; but then the Price of the Chickens in the Spring will ballance that. If they are kept altogether on Oats, it is obſerved they will *lay* well, tho' it makes them poor; but if they are made fat, they commonly give over laying. For the Goodneſs and Whiteneſs of the Fleſh the white-feathered Sort are beſt, eſpecially thoſe that have ſhort and white Legs: But thoſe that have *yellow long* Legs and yellow Beaks, are good for nothing. The oldeſt Hens are the beſt *Sitters*, and the youngeſt the beſt *Layers*. Care ſhould be uſed in the Choice of the Cock; for thoſe of the *Game Kind* are to be avoided, as no way for the Farmers Purpoſe. A *Hen* ſits Twenty Days, whereas *Geeſe*, *Ducks*, and *Turkeys* ſit Thirty. Near the Time of Hatching, let the Hen have Meat and Drink near her, that ſhe may not ſtraggle from her Eggs and chill them. Superſtition often governs where it ſhould not; but the good Wife *will* keep to her old *Mumpſimus* of an *odd* Egg, when ſhe ſets her *Hen*.

Turkeys. It is not two Centuries ſince *Turkeys* were firſt brought into *England*; and now they are become naturalized with us, they are obſerved to breed and thrive with little more Care than other Poultry. They are ſomething tender when they are very young; but if Hatching-Time be deferred till *May*, that Difficulty is ſoon over. And when they are full grown, they will endure a cold Winter even better than a Duck or Hen: For they will pearch upon a Gate or Wall in the coldeſt froſty Night, with the Rime upon their Backs.

It is obſerved they will eat and devour a great deal, if you give them *enough*; but they will alſo do well with a *little*; and if left to their Liberty when grown up, they will get their own Living, by feeding on Herbs and Seeds and Graſs. They are apt to ramble and ſtraggle about more than other Fowl, and are ſometimes offenſive and troubleſome in Gardens: But there is a very good and eaſy way to prevent that Inconvenience, by taking the Opportunity when you find them there, by a little Spaniel or ſharp Cur, to teaze and weary them about, as long as they can ſtand or run; and at laſt they will take their Flight: By repeating of which, you may depend upon it they will come no more there. *Peacocks* are alſo to be thus uſed and cured.

It is a good way to give the Young Ones (as ſoon as hatched) every one a Pepper-Corn to cure the Coldneſs of their Stomachs, and for the ſame reaſon afterwards to mix Wormwood chopt ſmall with their Food; which ſhould be Curds for three Weeks or a Month, and their Drink be *new* Milk; for if *ſour*, it kills them. The old faſhioned way of feeding Turkeys, is by *cramming* them with Barley Paſte; but under that Method they ſometimes miſcarry with being *choked*, either by Careleſsneſs or Unſkilfulneſs in not judging of a due Proportion. They will be very fat in the more natural Way, by feeding them that are intended to be fat by themſelves. Their Eggs are eſteemed delicate as well as wholſome, being great Reſtorers of Nature.

Duck. The tame *Duck* is as neceſſary and profitable a Fowl as any other, and kept with leſs Charge; for if they have but the Advantage of Water and Ponds, they will fetch from thence the greateſt Part of their Suſtenance. She lays Plenty of Eggs once a Year at leaſt; and in Sitting, where her own Choice is, (which is beſt) ſhe will cover Twelve or Fourteen Eggs, and bring them all to Perfection in a Month. The Young Ones will take the Water as ſoon as they are hatched; but if it rain, or the Weather is cold, they ſhould be houſed; for too much Wet quickly kills them, even after they are Two or Three Weeks old.

Gooſe. The *Gooſe* likewiſe is a Fowl of great Profit for the Spit, as well as for her Feathers, which are accounted the very beſt for Beds. They are reared and managed much in the ſame manner as Ducks, being a ſort of amphibious Creature, living both on Land and Water. Both Young and Old will live altogether on Graſs; and their Dung is thought to be very wholeſome for the Ground where they go, to keep Diſtempers from other Cattle. But Lanes, Highways, Commons and Waſtes, are the propereſt Places for Geeſe to range in. A *Goſlin* or green Gooſe in *May* is reckoned a Dainty, if made very fat: To do which you muſt ſhut them up at a Month old, giving them only ground Malt and Water or Beer, and they will be fit for the Spit in a Fortnight. Some think, that the upright Feathers on their Rumps being cut away will haſten their fattening; becauſe, from thence with their Bills they ſuck out Moiſture and Fatneſs. The *Stubble Gooſe* is alſo fatted in the ſame manner, and will be fat in the ſame time after it is put up. In ſome Places they find a Profit in *ſhearing* their Geeſe for their Feathers; others *pull* them twice a Year. This is the Practice of the Fen-Country, where they have vaſt *Droves* of them going on their extended Commons; and the Profit of theſe Feathers is very conſiderable, when they are ſent in Quantities to the Markets in *London*.

Pidgeon. There are great Varieties and Sorts of *Pidgeons* or Doves; and all of them ſo extremely profitable both for their Bodies and their Dung, that no conſiderable Farm ſhould be without a Dove-houſe; becauſe they are kept with little Coſt or Trouble, except the feeding them in hard Froſts or Snow, when nothing elſe is to be had abroad; and again, about *Midſummer* in *Benting-Time*, as it is called, when they are forced by Neceſſity to live upon *Bents* and the Seeds of Graſs. At which laſt Time eſpecially Relief comes ſeaſonably to them; not only for their own Sakes, but for the Sake of their young ones, which commonly are ſtarved and periſh for want of it. Mr. *Mortimer* tells, us he got a Pair of *Ring-Doves* Eggs, and hatched them under a tame Pidgeon; they liv'd with the Pidgeons, and bred ſo much better, that in a little time he had a great Increaſe of them, inſomuch that he might have ſtock'd a Dove-houſe with them; which he thought might be worth while to do, by reaſon of the Largeneſs of their Bodies and their Hardineſs; for they will live upon Ivy-berries, Turnips, and many other Things which a Pidgeon will not eat.

However that be, the wild Blue Pidgeon is a good Breeder, and will endure great Hardſhips: And if his Body be too ſmall, you may mend the Breed by mixing among them ſome of the large tame Kind; and this I take to be the beſt and the wiſeſt Courſe. But there is one Miſtake which hath oft-times proved fatal to a Dove-houſe, and the occaſion is not generally underſtood, and that is, when there are too many *Cocks*, eſpecially of the tame Kind: For they will fight and beat all others from the Place; and ſo quickly make a thin Dove-houſe, if a Remedy be not found to leſſen their Numbers.

There are ſeveral Methods uſed to tempt Pidgeons to ſtay, and to encourage others to come to a Dove-houſe. One very rational one is, now and then to lay Lumps of Salt, uſually called *Salt-Cats*, mixt with aromatic Seeds, in ſome By-place within their Houſe, to which they may at all Seaſons have recourſe. The Pidgeon is a hot Bird, and loves every thing that has Nitre and Salt in it; and therefore thoſe *Salt-Cats* are found mightily to delight them, and the Lumps will be quickly devoured: Thus it is found that Lime-Walls, which throw out Salt-Petre, will draw the Pidgeons to them, working out the Lime, *&c.* from between the Joints; the very Obſervation of which, I ſuppoſe, was the Mother of the Invention of *Salt-Cats*.

Another good Way, not only to *encourage* Pidgeons, but to *ſupport* them, is to lay a conſiderable Heap of Clay near a Dove-houſe; and with it, on all Occaſions, to mix what Brine can be ſpared from the Houſe, tempering and ſtirring it well together. Hither the Pidgeons will quickly reſort in great Numbers, and eat not only the *Salts*, but alſo the very *Clay* that is mix'd with it. Pidgeons are very apt to be ſcabby on the Breaſts and Backs; which Diſtemper commonly kills the young ones, and makes the old ones ſo weak and faint, that in a Time of Hardſhip a Dove-houſe will well nigh be deſtroyed with it. A very likely Cure to prevent which, is the above-ſaid *Salt-Cats*, eſpecially if an Ounce of *Aſſafœtida* be added, and mix'd with the Lump.

The Pidgeon alſo loves Neatneſs and Cleanlineſs; and therefore the oftener the Houſe and Holes are cleanſed, the better, and the more they will be encouraged to ſtay and breed; eſpecially if Care be taken that no Enemies approach to hurt them, their young ones, or their Eggs. Of which ſort are Fulmores and Weezles; which are apt to creep in at inviſible Places in the Foundation or elſewhere: But when they are once diſcovered, great Diligence muſt be uſed to catch them by Traps; otherwiſe they will ſoon make deſperate Havock amongſt the Pidgeons, eſpecially their young ones. *Starlings* alſo are bold Intruders, and will ſuck their Eggs; for which there is no Cure but the Gun: The Cure alſo for Hawks, that aſſault the old ones without Doors.

The cheapeſt Way poſſible for building a Dove-Houſe, is to make the Walls with Earth or Clay mixt with Straw, in the ſame manner as they make their Mound-Walls in *Northampton* and *Leiceſterſhire*; which are not only durable and cheap, but ſingularly warm. I made a Dove-houſe my ſelf after this manner; which anſwered my Expectations well, and coſt me I think about Five Pounds; being (if I remember) about Four Yards ſquare in the clear within-ſide. I made the Walls Four Foot thick and Twelve Foot high; and before I ſet on the Roof, and whilſt the Walls were a little greeniſh, with a coarſe Chiſel I ordered a proper Number of Holes to be cut out ſquare; which was done with a deal of Eaſe,

the

the Walls being, as I ſaid, not quite dry. The Holes were made (as they ſhould be) a little *dipping* backward, and about Fourteen Inches deep: So that when the Walls were covered with a Roof and become perfectly dry, they were a warmer Habitation for the Pidgeons than any other ſort of Building made with Brick and Stone, tho' fram'd with Wood: And accordingly the Pidgeons proſper'd to a Wonder whilſt I was in *Northamptonſhire.*

Tares and *Vetches* are the Food which Pidgeons moſt of all covet and love; but Peaſe, Beans and Barley are good, and will make them breed well, even every Month in the Year, if they have enough. There are ſome exceeding large Sorts of tame Pidgeons near *London*; the young ones whereof come ſo early and are made ſo fat, that there is a conſtant Demand for them at great Mens Tables; and they will not (you may imagine) want for Price: For all populous Places encourage the Product and Sale of every Thing good in its kind.

By what has been ſaid, it may appear how profitable a Dove-houſe is in its Produce and Increaſe; and the Value of the Dung I have elſewhere ſufficiently explained. Neither will I go about to remove the ſilly Superſtition of thoſe, who are, with Art, made to believe that a *new Dove-houſe and Death are inſeparable.*

Peacock and Swan. *Peacocks* and *Swans* being generally kept more for Ornament and Fancy, than any great Uſe or Profit to a Farmer, it is out of my Purpoſe to be particular about them. The firſt are ſaid (how true I know not) to clear the Ground of Adders, Toads and other venomous Creatures: The other will very much clear Ponds and Rivers of Weeds, which they greedily devour; and not *Fiſh*, as it is generally by Miſtake thought they do. The Fleſh of either is not worth much; tho' young *Cygnets*, fatted as green Geeſe, are by many thought a great Dainty.

Of BEES.

THERE are two ſorts of Inſects greatly profitable, and highly deſerving the Care, the Love, and the aſſiduous Attendance of every painful Farmer, ſtudious and inquiſitive after every thing that may make Returns of Profit, and fetch in an honeſt and commendable Gain; and theſe are the *Bee* and the *Silk-worm*; both of them deriving their Support and Riches from Vegetables.

The *firſt* of theſe, the *Bee*, falls under our preſent Conſideration; which is an Inſect, by All allowed to be an Example of Induſtry to a Proverb: Never idle, but when Work is dangerous or impoſſible; that is, in the extremeſt Colds, and in the wetteſt Seaſons. They are early out in the Morning to gather Honey; when like Swarms they may be heard and ſeen clinging on the Bloſſoms and Leaves of Trees; and in the Evening late they return from their hard and aſſiduous Labours.

At feſſæ multa referunt ſe nocte minores
Crura Thymo plenæ——————— Virg.

In *Engliſh* thus.
But thoſe that youthful be and in their prime,
Late in the Night laden return with Thyme.

On every Buſh and Tree about they ſpread,
And are with Caſſia *and rich* Saffron *fed.*
On purple Daffodils *and* Lindens *tall,*
All reſt at once, at once they labour All.
Early they march, and ſtay till Evening drives
Them from ſweet Fields and Food to ſhelt'ring Hives.

Idleneſs is a Thing ſo hateful in this Commonwealth, that they will tolerate it in none ſave their Sovereign; for All are buſied, either abroad in gathering Food, or at home in building Combs, or feeding their Young, or ſome other Employment: But the Drone and uſeleſs Bee is ſure to die for it; or, as the Poet above elegantly deſcribes their laborious Care,

Venturæque Hyemis memores æſtate Laborem
Experiuntur———

Mindful of Winter, labour in the Spring,
And to the publick Store they Profit bring:
For ſome provide, and by a Compact made
Labour abroad; others at home are ſtay'd
To lay Narciſſus *Tears, and yielding Gum,*
As the firſt Ground-work of the Honey-Comb.

The Oeconomy and exact Government, which the induſtrious and wiſe Bees obſerve amongſt themſelves, has exerciſed the Study and Pens of the ingenious and learned Obſervers for many Years paſt; and many conſiderable Volumes have been publiſhed on that Subject, in order to diſcover the Myſtery of their Art in compoſing Combs, and lodging their ſweet and liquid Treaſure, as well as to underſtand the Wiſdom of their Laws, by which the Peace and Welfare of their Government is ſecured.* For which Purpoſe, of late Years, *Hives* in octogone Frames have been contrived, with Glaſs on the Backſide, thro' which may be ſeen the Motion and Working of the Bees; and they are alſo ſo ordered, that the Bees may have room to work upwards in Stories, to prevent the Inconvenience and Danger of their Swarming. This was firſt thought on and invented by a Kinſman of my own, Mr. *Mew* of *Glouceſterſhire:* And it ſeemed to bid fair for a full Diſcovery of that myſterious Commonwealth, as well as to make great Improvements by ſaving the Lives of the Bees. But alas, there are ſtill great Diſputes; and we know not yet the Nature of their Laws, nor the End and Reaſon of their Motions. We know not certainly whether their Government be *Ariſtocracy* or *Monarchy*; whether they are governed by Many or by One; or, if it be a Monarchy, whether it be a *Male* or *Female* that governs. Theſe Things are only Conjecture, and the Learned on both Sides think they can ſupport their Opinions by probable and ſpecious Reaſons.

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* *It is ſaid, the Philoſopher* Ariſtomachus *ſpent Sixty Years in contemplating the Polity and Government of their Commonwealth, whoſe Baſis is chiefly grounded on a mutual Love of one another.*

Beſides, I could never yet ſee the great Advantage boaſted of from theſe *Caſes* or Glaſs-Hives, either as to a Diſcovery of their Government, or the Increaſe of their Riches. The Glaſs behind lets you ſee a great deal of their uncertain Motions; that they are *buſy* and in a *hurry*, always in Summer moving from Place to Place; but you can make little of *what* they are doing, much leſs *how* they do it, or by what Authority. And then, as to the Advantage in Point of Profit and Increaſe, I could never find but that in a favourable Year, the *ordinary* Way of ſingle Hives, and Swarming, as great an Increaſe both of Stock and Honey have been made, as in theſe late invented *Caſes*; and in a bad Year, neither of them are found to do any great Feats.

Beſides again, there is one Diſadvantage which always attends theſe *Caſes* or Glaſs-Hives, where the Bees work upwards, *viz.* that you are always forced to leave the lateſt and the beſt *Virgin-Honey* behind, and to be content with Honey of one, two, or three Years old; which every one knows is the worſt and coarſeſt ſort for all Purpoſes. For the Method is, before you take the Honey, to drive the Bees into the upper *Caſes*, to ſave their Lives; and to thruſt in a thin Piece of Board made for that Purpoſe through the Combs at the ſeveral Diviſions of the *Caſes*; ever beginning at the Bottom-Story, where the moſt and the worſt Honey is. Whereas, in the ordinary Way of Hives, when you find that a *Swarm* or a *Caſt* is too weak to go through the Winter, it may be taken up and made uſe of, as one of the greateſt Delicacies at an elegant Entertainment.

Having ſaid thus much of the Nature and Qualities of theſe new-contrived Caſes for Bees, it will not be expected that I ſhould enlarge in their Deſcription and Make: But if Curioſity excite any one to attempt a Trial to pleaſe his Fancy, he may almoſt in every Country meet with Specimens, which will be a better Direction than what can be expreſſed in Words.

It is certain there are no Creatures that live at more Unity among themſelves than Bees. They ſeem to have all Things in common, and one is always ready to revenge the Injuries of another. Where there is any Degree of Curioſity in the Owner, nothing about an Houſe doth ordinarily give more Pleaſure and Profit than theſe; which take up little Room, provide their own Food, and require no great Attendance, except in Swarming-time. Theſe Conſiderations have put many ingenious and inquiſitive Perſons, not only upon new Contrivances to ſave their Lives, as above; but alſo upon intenſe Studies and Obſervations on their Nature and Government, in order to ſupply them with ſuch Conveniences and Comforts as may aſſiſt their Labours, and encourage their Induſtry.

Mr. *Bradley*, who tells us he has been exact in his Obſervations on Bees, ſaith, there are plainly three Sorts diſtinguiſhable. The *firſt*, he ſaith, is properly called *Bees*; ſuch as gather Wax, work it, make the Honey-Combs and Cells, gather the Honey and fill them, ſupply their Young with Food, keep the Hive clean, and defend it againſt their Enemies; all theſe have a *Sting*.

The ſecond ſort are called *Drones*, commonly much larger and of a darker Colour, ſomething longer and thicker than the *Bee*. Of theſe there are but few in ſome Hives, and more in others. Theſe *Drones* have the ſame Original with the Bees; for they proceed from the King or Queen-Bee: And as in the Hives it is obſervable there are ſome Cells one third,

third or one half longer than the common Cells, the *King* makes Choice of theſe large Cells to lay thoſe Eggs in from which theſe Drones proceed, aſſigning them Habitations proportionable to the Bigneſs they are to attain to in their full Growth. They have no Sting, and are ſeldom ſeen out of their Hives; and if they go out, it is about Three in the Afternoon, and in fair Weather; and when they return, they do not come laden with Wax as the other; for they only keep hovering about and humming in the Air, not far from their Habitation. They continue Part of the Summer diſperſed in the Hives; and afterwards, as their Numbers increaſe, they draw together in Troops in ſeveral Parts of the Hive, where they lie cantoned, as it were, without making any Motion, from the End of *July* to the Middle of *Auguſt:* At which Time the common Bees attack them; and tho' they make what Reſiſtance they can, they are at laſt all driven out of the Hive, and what becomes of them is not known.

When this Fight happens between the *Bees* and *Drones*, all the Bees are in Motion, as well without as within the Hives; and notwithſtanding the tender Regard the Bees ſhew for theſe very *Drones* when they are young, it is amazing to ſee, that by the latter End of the Summer it ſhould be turned to ſo univerſal a Hatred, that they do not ſpare even the young Drones that are imperfect in their Cells; but while one Party of the Bees is buſy in driving the great Drones out of the Hive, another Party is employed in opening the Cells, where the imperfect Drones are, pulling them out, killing, and quite removing them from the Hive.

But there is yet a *Third Sort*, longer than the *Drones*, tho' not proportionably ſo thick, but of a more lively red Colour. There is for the moſt part but *One* of theſe in a Hive, and never above *Three*. This Bee hath a Sting, with a grave and compoſed Gate, and for that Reaſon hath been called the *King* or *Queen Bee*, and is the Mother of the reſt.

This Bee is ſo fruitful, that ſhe is thought to breed Eight or Ten Thouſand Young Ones in a Year. She is for the moſt part concealed in the upper Part of the Hive; and is rarely, if ever, to be ſeen, but when ſhe depoſits her Young in ſuch Combs as are expoſed to the Sight. She is ſcarce to be ſeen but upon thoſe ſingular Occaſions, and oftentimes not then neither; becauſe a great Number of Bees, hanging one to another, form a ſort of Veil or Curtain from the Top of the Hive to the Bottom, and ſo often intercept the Sight of her; not removing till ſhe has done *laying*.

When this *Queen Bee* (for we muſt call her ſo now ſhe has been laying Eggs) appears in publick, about a Dozen Bees of a Size larger than ordinary always attend her, and as her *Retinue* follow her wherever ſhe goes. She moves with a very compoſed and grave Gate; and when ſhe is about to *lay*, looks for an empty Cell, that has neither Honey, Wax, nor Embrio in it; and having put her Head into this Cell for a Moment, ſhe immediately turns about, and thruſts in the hinder Part of her Body ſo far till it touches the Bottom of the Cell, the Bees of her Retinue ſtill ſtanding round about her, with their Heads turned towards her, and ſeem to careſs her with their Trunks and Legs, and, as it were, feaſt her. After a little while ſhe comes out of the Cell, where a ſmall ſlender Egg may be perceived to be left. And thus ſhe paſſes from one Cell to another for Nine or Ten Times one after another immediately, her *Retinue* ſtill waiting on her; and having done, retires again into the inner Part of the Hive, and is no more to be ſeen for ſome time.

After Four Days theſe Eggs turn to *Maggots*, and the Bees afterward carry Honey for their Nouriſhment, and by the Eighth Day bring ſo much as to take up the whole Breadth, and part of the Length of the Cell; then they ſtop up all the Cells that contain theſe Worms, and take no more Care of them. In this Condition they remain Twelve Days, but ſuffer divers Changes, till at the Twentieth Day they become perfect Inſects; and having made a round Hole with their Jaws in the Covers of the Cells, get out, come out of the Hive, go immediately abroad in Gardens and Fields, gathering Wax and Honey. When this young Bee is gone out of the Cell, there preſently come *two Bees* to it; one of them takes away the Cover, chips it and uſes the Wax elſewhere; the other is employed in putting it in the ſame hexagonal Form it was in before the Egg was laid there; and ſometimes, the ſame Day a new Egg is laid in the ſame Cell.

As to the *Situation* of an Apiary, the firſt and chief Care ſhould be to ſet it ſheltered from Winds on all Sides if it be poſſible; and that End is better anſwered by *Hedges* than by *Buildings*, which do but form Eddies and circular Currents: For the want of *Shelter* is more prejudicial to Bees, than the want of *Sun*. Not that they ſhould want the Sun to enliven cheriſh and comfort them, even before they are able to ſtir abroad; but yet the over-bearing Power of the Sun's Heat at *Midſummer* ſometimes doth great Injury, by melting the Wax and letting out the Honey. To prevent which, I ſhould therefore chuſe to let the Apiary face the *South Eaſt*, that it may have the Sun's Morning and earlieſt Influence, and not be hurt by the ſcorching Afternoon Heat, which it ſhould loſe by Two or Three a-Clock.

In the common way of managing Bees in Straw Hives; if you intend to multiply your *Stocks*, you muſt make the Hives *ſmall*; but if you aim to encreaſe your Quantity of *Honey*, your *Hives* ſhould be the *larger*. And every Hive ſhould be ſet upon a ſingle Stool, kept clean from Weeds, which do but harbour Slugs or Snails, which are great Enemies to Bees. They ſwarm earlier or later, according to the Seaſon: But about the Middle of *May*, if the Weather hath been temperate and kindly, you may look out for a Swarm. The uſual Signs foretelling it are theſe: When the Hives are full, they will begin to caſt out their Drones: They will hover about the Mouth Evenings and Mornings: You will find Moiſtneſs and Sweating upon the Stool: They will run luſtily up and down, and lie out Evenings and Nights that are ſultry, and go in again when the Air is clear. In a hot Gleam, and after a Shower or gloomy Cloud hath ſent them home together, then they chiefly delight to riſe; and when they gather together at the Door without, hanging together in Swarming-time and not before, then you may almoſt certainly conclude they will riſe if the Weather hold. But to lie out continually under the Stool or behind the Hive, eſpecially toward the Middle of *June*, is rather a Sign or Cauſe of their *not* Swarming: For when once they have taken to lie without, and have Plenty of Food within, they are ſo ſet upon the Delight of their Riches, that they have no Leiſure to ſwarm, tho' the Weather favour them to come abroad with Safety.

In order therefore to make Bees ſwarm, keep the Hive as *cool* as may be, by watering and ſhadowing both it and the Place where it ſtands; and then enlarging the Door to give them Air, move the Cluſter gently with your Bruſh, and drive them in. If they will ſtill lie forth, and not ſwarm; then the next calm and warm Day about Noon, whilſt the Sun ſhines, let the better part be put in with your Bruſh, and the reſt gently ſwept away from the Stool, not ſuffering them to cluſter again: And ſo thoſe riſing in the calm Heat of the Sun, by their Noiſe, as tho' they were Swarming, will ſometimes call the other forth, and ſo ſwarm together.

Divers other Ways have been tried to make them ſwarm; as by placing a Platter or large Pewter-Diſh under the Cluſter of Bees as they are hanging out in the Heat of the Sun, or by ſmooth paring of the Ground under them, ſtrewing the ſame with hot Sand. If none of theſe Methods will do to provoke them to ſwarm, but that they lie out ſtill, then rear the Hive enough to let them in, and clay up all the Skirts but the Door; and if this Experiment fail, it may be concluded there is no Remedy.

The Signs of After-Swarms are ſomething more certain; for when the Prime Swarm is gone, about Eight Days after, when another Brood is ready and hath again over filled the Hive, the next Leader or Captain begins to tune his Voice, at the Sound of which the Queen gives her Conſent in a Baſs-Note, and ſo they all quickly come forth. There is an idle Superſtition of ringing a Kettle or a Bell while they are Swarming, as if *that* would haſten them to ſettle and compoſe themſelves; whereas, on the contrary, all *Noiſe* is a Diſturbance to them. The Origin of the Cuſtom ſeems to have been only to give Notice to the Neighbourhood that there is a Swarm up; and if they ſhould go aſtray, to ſignify to whom they belong: But to prevent that Danger, ſome do more rationally throw Duſt or Sand amongſt them to make them come down.

When a Swarm has choſen a lighting Place, which is commonly on the Branches of ſome low Trees, they preſently knit together on a Cluſter; and when they have ſettled, and the Cluſter has been at the biggeſt for ſome time, then you are to hive them with as much Dexterity and Caution as poſſible, ſhaking them all at once, if it may be, into a Hive well rub'd before with Honey and Sweet Herbs, and ſtuck with ſmall white Wands. When a Swarm parts, and the two Diviſions light in Sight of one another, diſturb the leſſer Knot, and they will fly to their Fellows; but if they chuſe lighting Places not in Sight, then hive them diſtinctly, and afterwards bring them together, and they will readily unite.

So alſo, if your Swarm happens to come late in *June* or *July*, and leſs in Quantity than a Peck, put two or three Swarms together, if within two or three Days of one another; and by uniting them thus, they will labour hard, get a ſufficient Quantity of Honey, and defend themſelves againſt their Enemies. This, as well as the former Work, muſt be done in an Evening.

The Age of a Bee is only Twelve or Thirteen Months. And therefore, toward the End of Summer their Number begins to leſſen, and the laſt Years Brood by degrees waſte and die away, their Wings *firſt* failing them; ſo that only the Young of the preceding Spring ſurvive to continue the Kind till the next Year. A little before or a little after *Michaelmas* is the beſt Time for removing Stocks from Place to Place, tho' any time in the Winter before the Beginning of *March* may do; but *Swarms* are beſt carried and convey'd the Day after Swarming, as ſoon as the Bees are quiet.

The beſt Time of taking the Honey, is about the Middle or latter End of *Auguſt*; for after that they eat more than they get. The common Way of killing the Bees, and ſaving the Honey, is to dig a Hole hard by, a little bigger than the Bottom of the Hive, into which ſtick one or two Matches of Brimſtone Five or Six Inches long, ſo that the Top of them may be even with the Surface-Top of the Hole. The Matches being fired, gently and dexterouſly lift off the Hive, and ſet it over the Hole, and immediately cloſe up the Hive at the Bottom, that none of the Smoak may get out, and in a few Minutes the Bees will be all dead.

The Honey that runs out without much ſqueezing or breaking the Combs is beſt, and ſhould be preſerved by itſelf for the beſt Purpoſes. The older the Hives are, the worſe is both the Honey and the Wax: Therefore the beſt Honey of all others for eating at the Table, is that which is taken from *late* Swarms or Caſts, which prove too light to ſtand the Winter. And this is properly the *Virgin-Honey*, uncorrupted and undefiled either by Time or Mixture.

Becauſe in the Attendance and Management of Bees, it is not uncommon to find the Smart of their Stings, and to feel the Effect of their Anger, which is no leſs than Poiſon to the Part affected, it may not be improper to direct a ſuitable Remedy. The firſt thing to be done is to pull out the Sting as faſt as you can; and if near a Fire take a live Coal, hold it as long to the Place as you can poſſibly endure it, which will draw out a great part of the Poiſon; and applying a little Honey to the Wound, will perfect the Cure.

Some think, and ſpeak it with Aſſurance, that a Copper Half-penny applied to the wounded Part will immediately aſſwage the Pain, and prevent the Swelling; and others aſſure us, that let the Sting of a *Bee* or *Waſp* be never ſo violent, if we apply ſome of the milky Juice of the Fig-tree, the Pain immediately ceaſes and the Swelling abates, tho' it be never ſo violent. See *Bradley*, Pag. 93. for the Months of *Auguſt* and *September*.

There are divers Things injurious and hurtful to Bees; ſome of which I have occaſionally mentioned before: But the chief Enemies to them are much Smoak; continued Noiſe; bad Weather; offenſive Smells; noiſome Creatures; Mice and Birds; Hornets and Waſps; and even Bees themſelves, which will be ever and anon robbing one another, the *ſtrongeſt* always aſſaulting the *weakeſt*: And this Battel is ſometimes prevented by ſtopping up the Hive cloſe for a few Hours; or by killing ſome of the Robbers as they come. Bees preſently diſcern a Cloud that is like to end in a Shower; and therefore in ſuch a Caſe they are obſerved to return Home in great Haſte and Numbers. In many other Caſes likewiſe they diſcover great Sagacity, and even communicate their Deſigns by the Motion of their Bodies. When they would remove their Station, *one* makes a Motion with her Wings, which cauſes a ſmall Sound; *others* follow her Example and retire: And thus they prepare themſelves for their daily Labour in the Morning, as well as when they prepare to ſet up a Commonwealth of their own by *Swarming*. Some think, that by the Motion of their Wings they give Notice to others to diſburthen them of their Wax when they come home laden; and that when one Bee is at work on the Combs, and wants Honey of another that has brought it home, ſhe thruſts out her Trunk, and takes it from between the Jaws of the other, and receives it without ſpilling. However probable theſe Conjectures are, I doubt they are far from Certainties.

Both Parts of the Bees Riches, the *Wax* and the *Honey*, are not only profitable, but uſeful both in Surgery and Phyſick. Beſides the ſingular Uſe and great Demand of *Wax* for Lights and Candles, preferred before all others, it is in Surgery the Ground of all *Salves* for Wounds, and *Cerecloths* for weak Parts; beſides, it ripens *Ulcers*, and mollifies contracted *Sinews*. Its *Oil* is thought of the moſt ſovereign Virtue to cure Wounds, be they never ſo large or deep; for by the help of Stitching, it makes a Cure in Ten or Twelve Days at moſt; and by only anointing ſmall Wounds, it heals them in Three or Four. A Dram of this *Oil* in White Wine provokes Urine, helps Pains in the Loins, and removes other ſort of Stitches that are contracted by Colds.

The *Honey* alſo is not leſs uſeful and profitable: For beſides that it makes a moſt pleaſant Liquor for the preſent drinking in the Summer called *Mead*, and alſo a more laſting and ſtronger-bodied Wine (which is a great Imitation of Sack or Canary) called *Metheglin:* Beſides theſe, I ſay, and many other uſeful and excellent Purpoſes, for which Honey is accounted good and applied accordingly; it is accounted phyſically ſovereign for opening Obſtructions, clearing the Breaſt and Lungs of thoſe Humours that fall from the Head: It provokes Urine and keeps the Body open, nouriſhing it, and breeding good Blood, and thereby prolongs Life. It is remarkable, that it keeps all Things uncorrupted that are put into it; and for that reaſon Medicines that are intended to be kept long are uſually prepared with it. It is a great Ingredient in all the ſorts of *Treacles*, and is eſteemed good againſt *Pleuriſies*, *Ptiſicks*, and other Diſeaſes of the Lungs. However, to ſome Conſtitutions it ſhould be obſerved that *Honey* cauſes a very violent and immoderate Flux; therefore when *that* is once diſcovered, it ſhould be either cautiouſly uſed or wholly neglected: But yet that Violence is very much corrected when it is *clarified.*

Of SILK-WORMS.

THE *Silk-worm* is another Inſect that derives its Nouriſhment altogether from Vegetables; and conſidering the curious and inviſible Method of working Webs of Silk out of its own Bowels, and the ſeveral odd Metamorphoſes it undergoes, may be thought one of the moſt extraordinary Creatures in Nature. But beſides its Curioſity, it is a moſt *profitable* Creature, when it meets with that kind Indulgence, which its Diligence and Induſtry calls for. It is but of late Years that the *Silk-worm* hath been introduced amongſt us here in *England*; and as yet they are not encouraged, as they ought, in any great Quantities or in many Places. The chief Obſtacle ſeems to be the Want of Food, a ſufficient Number of Mulberry-Trees, whoſe Leaves alone are undoubtedly (whatever ſome may ſay to the contrary) the proper Food, from which any Product or Profit can be depended on.

But beſides this, there is another Diſcouragement which hath in great meaſure prevented the Removal of the former Obſtacle; and that is, the

Obſervation that the Diligence and Attendance required outgoes the Profit: But that this is owing to the Want of an eſtabliſhed Manufacture, the Practice of Foreign Countries, as the like Defect in parallel Caſes, demonſtratively proves. The vaſt Riches of the *Southern* Countries, gained from the Labours of this little Inſect, plainly ſhew that where no Accommodations or Materials are wanted to employ a Multitude of Hands in a regular Society and Combination of Undertakers, the Silken Manufacture muſt anſwer; and *we* may grow rich thereby in *England*, as well as *they* in *France* and *Spain*. For we every Day ſee, *thoſe* that deal in *little* Quantities in any Way of Life, or in almoſt any Commodities whatſoever, becauſe they have not conſtant and regular Employment for the Hands they are forced to uſe, and it may be at the ſame time wanting Abilities in the Methods of Commerce, grow poor and ſtarve; whilſt at the ſame time *others* in an eſtabliſhed Society, dealing in *great* Quantities, and better verſed in conſigning Hands to proper Places and Times, get vaſt Eſtates by the very ſame Commodity and Buſineſs which made the others poor.

As to the Objection which ſome make with reſpect to the Coldneſs of our Climate, I think there is not much in that; eſpecially if the *Southern* and beſt ſheltered Parts of our Iſland be choſen for the purpoſe. For we ſee with Pleaſure, that in many agreeable Soils and Situations, the *Mulberry* thrives to a Wonder: And we ſee alſo, that from their Leaves the *Silk-worm* is nouriſhed to Perfection. The Eggs are hatched the Beginning of *May*; the Worm eats, and encreaſes with her Food: At full Stature ſhe ſpins her Web; the Male and Female engender; the laſt lays her Eggs and they both die, as in other Countries, within the Compaſs of the Summer's Warmth and Heat. And if in leſſer Quantities we can propagate and encreaſe Eggs, Worms and Silk; what ſhould hinder us from doing more, and making the ſame Advantage to our ſelves and the Nation, which Foreigners acquire to theirs? I will not call it Sloth and Indolence, becauſe I believe no Nation upon Earth have, of late Years eſpecially, made greater Improvements in all ſorts of Arts and Sciences, in Trade and Manufactories, than the *Engliſh* have done; but there is an Account to be given of this Matter leſs diſhonourable, *viz.* the Pleaſure and Profit of Gardening and Plantations ſeem to be but of late come into Taſte. Three or Fourſcore Years ago, there was but here and there a Man to be found that had a Genius for planting any thing but Oaks, Aſhes and Elms in the Foreſt; and a Pear, Apple and Plumb in the *Orchard*. If a *Mulberry* happened to be found in his Grandfather's Garden, it was almoſt ſingular, and gazed at as a Rarity. And tho' in King *James* the Firſt's Time (of which more anon) there was a ſufficient Hint given by that Prince, and a goodly Scene opened, preſaging many future Advantages; yet *Ars longa Vita brevis* took place, and little was done agreeable to that Prince's Exhortations for planting *Mulberries*; looking ſtill at Home, and on the preſent Generation, without much regarding what might conduce to the Benefit and Riches of *Poſterity*.

However *ſomething* was done, and thoſe few ancient Trees we have are much owing to that Prince's publick Spirit; but yet a conſiderable Manufacture cannot be begun and carried on, but by ſuch numerous Plantations, as may effectually anſwer all Demands; and *that* muſt be a Work of Time. Not but that I hear of late ſeveral large Plantations are begun with a view of a conſiderable Manufactory; and by this time muſt be arrived to that Maturity, that we may quickly expect to hear that foreign Silks muſt give Place to the *Engliſh* ones manufactured by a People of a ſuperior Genius.

With a View and Expectation of ſomething very conſiderable in this Kind, I ſhall lay down ſome Directions for the Management of the Silk-worm; not in the leaſt doubting but that ſtill ſome better Maxims, ſupported by the long Experience of thoſe abroad, may be obtained hereafter, for the readier carrying on and perfecting this important Work.

It is, in the firſt Place, then to be obſerved, (as I have already taken Notice under that Head,) that there are two Sorts of Mulberries, the one *Black*, the other *White*; both of them ſerviceable to the Silk-worm: But foraſmuch as the *White* ſort (tho' it hath but an inſipid Fruit) is a quick Grower, and hath a ſmoother Leaf; it is *therefore* generally preferred and planted for the Uſe of the Silk-worm before the other, which hath a rougher Leaf. But, as I ſaid, either of them will do well; the great Difficulty is to get enough of either.

About the Beginning of *May*, when the Mulberry begins at firſt to explain its Leaves, the Eggs of the Silk-worm ſhould be laid in a Window in the warm Sun, or betwixt Flannels in ſome warm Place; for Heat and Warmth ſoon hatch the Eggs. *Sooner* indeed this might be done; but it were to no Purpoſe to do it *ſooner*, becauſe their Food would not be ready for them. When they are hatch'd, it is uſual to lay over them clean Paper full of Holes, and upon that Paper they lay the Mulberry-Leaves, to which the little Inſects will ſoon find a Paſſage, and faſten themſelves; and after that there needs little more Care during the Time of their feeding, but ſhifting their Leaves as Neceſſity requires, keeping them clean both from dead Leaves and their own Dung.

The ſlighteſt kind of Covering will ſerve the Turn, to defend the Silk-worms from the Injuries of the Weather. In *Italy* and *Spain* they are kept and fed in the ſame earthen floored Rooms, wherein the poor People live and ſpin, and do their other Houſhold Affairs, feeding them on Shelves or Tables without more Curioſity.

In *Sicily* boarded Houſes are commonly ſet up in the Fields round the Mulberry-Groves, with Shelves two Foot above one another to the Roof, and a Table in the Midſt of the Room; on both which they ſpread Leaves for the feeding the Worms. A Man and a Boy will attend all the Worms that come of Six Ounces of Eggs, and thoſe, one Year with another, will ſpin ſixty Pounds of Silk worth 20 l. a Pound; in all 1200 l.

In *Turkey* the Worms are fed in long Barns made of Reeds or Canes, both Walls and Roofs; where they are fed, and afterwards ſpin their Bottoms upon the very Reeds, without more Trouble. Nay, it hath been known that even upon the very Mulberry-Trees themſelves, where the Inſects have been directed, the whole Charge of Attendance has been ſaved, and the Silk hath been brought to Perfection; which is undoubtedly the *eaſieſt* and moſt natural way, but not the *ſafeſt*. For every Storm and Hurricane (to which the *Southern* Countries are moſt ſubject) and all Thunder and Lightning are fatal to the Silk-worm, and ſometimes even within-doors. In which reſpect *England* is more happy, and on that account more preferrable than even the *Southern* Parts, as not ſo ſubject to ſuch Diſappointments and Loſſes.

It is obſerved that the Worms are commonly ſick three or four times during their feeding. Generally a Fortnight after they are hatched, and every Week after, two or three times. Their beſt Phyſick is to give them but little while they are ſick. The whole Time of their feeding is about Nine Weeks: And as they get Strength and grow bigger, it need hardly be ſaid that you muſt give them more and oftener, which will encreaſe the Attendance.

The Leaves, before they are given to the Worms, ſhould be clear of Dew or Rain; and therefore if they are gathered early, they ſhould be ſpread upon the Table to dry. Extremes both of Heat and Cold, or Drought and Moiſture, are hurtful to this Inſect. And therefore they ſhould not be laid either near the Roof of an Houſe, nor on cold damp Floors.

When they have fed as long as they are able, they begin to look clear and prepare themſelves for Work; at which time they ſhould have Air diſcreetly given them. Some lay clean *Heath*, or the Branches of *Lavender* and *Roſemary*, in the way of Arches, for the Worms to faſten and ſpin their Webs in: But the moſt adviſeable way (for the ſake of clean winding off the Silk) is to make hollow Cones of Paper, and into every one of thoſe put a Worm, where it will quickly make a Web, and in three Days cover itſelf all over with Silk, ſo as to be ſeen no more till it be ſuffered to work its Way out for the Buſineſs of Propagation.

In about a Fortnight they commonly finiſh their Bottoms. Thoſe that firſt finiſh are uſually reſerved for Breeders of both ſorts. The *Males* are diſtinguiſhed from the *Females* by the Lankneſs of their Caſes, the Ends whereof are longer pointed. When they are found looſe in their Caſes, both Male and Female will eat their Way out in Four or Five Days Time, when they ſhould be put together for Procreation on a large Piece of white Cap-Paper. One of theſe Females will lay from Two to Five Hundred Eggs; ſo that a few Inſects kept for that purpoſe is ſufficient. The reſt (not ſuffering them to ſtay to eat their way out, becauſe that is ſome Prejudice to the Bottom) ſhould be put into an Oven of gentle Heat, juſt ſufficient to kill the Worms.

The *Metamorphoſis* of this Inſect is very ſurpriſing; for it comes out of its Cell in the Form of a Butterfly, with four Wings, ſix Feet, two black Eyes, and a Pair of Horns. The *Males* fluttering with their Wings will ſoon couple with the *Females*; in which Poſture they are to be left Nine or Ten Hours from Morning till Evening, when the Females are to be gently pulled away, and the Males thrown away as of no further Uſe. The Female then lays her Eggs, which are at firſt *white*, afterward *green*, then *red*, and at length they retain the *grey Colour*.

The *Virginia* Worms are much larger than others, and they will wind Bottoms as big as a Lemon, faſtening themſelves naturally on the Boughs of the Mulberry-Trees, till they fall to the Ground and periſh in Autumn; and ſuch Eggs as eſcape the Birds are the natural Reſerve for the next Years Labours, as ſoon as the Heat of the Sun hatches them. Mulberries, both there and in *England*, will put out a ſecond Crop of Leaves after the firſt are eaten and devoured.

The Method of winding the Silk off the Bags, is firſt to find their End, which is not difficult, and then put about a Dozen of them into a Baſon of Water, wherein is mixed a little *Gum Tragacanth*, commonly called *Gum Dragon*; and thus they will be readily and eaſily wound; for the ſmall Hairs of Silk ſeldom break; or if they do, they are with little Difficulty found again. Sometimes the Bottoms prove gummy; and then they ſhould be thrown into a Lye of Wood-Aſhes, or Soap-Boilers Liquor made ſcalding hot for a little while, and after that put into ſcalding fair Water.

But foraſmuch as I have above mentioned the Encouragement given by King *James* I. for carrying on the Silk-Manufactory, by planting and increaſing Mulberry-Trees; it may not be unacceptable to the Curious to inſert that Prince's Letter to the Lords Lieutenants of the ſeveral Shires of *England* to that very Purpoſe; becauſe it contains, not only a true Zeal for the Good and Welfare of his Country, but ſubſtantial Reaſons for the ſetting about ſo good a Work.

JAMES REX.

Right Truſty and Beloved, We greet you well.

"IT is a principal Part of that Chriſtian Care which appertaineth to "Sovereignty, to endeavour, by all Means poſſible, as well to beget as to encreaſe among their People the Knowledge and Practice of "all Arts and Trades; whereby they may be both weaned from Idleneſs, "and the Enormities thereof, which are infinite, and exerciſed in ſuch "Induſtries and Labours as are accompanied with evident Hopes, not only of preſerving People from the Shame and Grief of Penury, but alſo "raiſing and increaſing them in Wealth and Abundance, the Scope which "every free-born Spirit aimeth at; not in Regard of Himſelf only, and "the Eaſe which a plentiful Eſtate bringeth to every one in his Particular; but alſo in regard of the Honour to their native Country, whoſe "Commendations is no way more ſet forth, than in the People's Activeneſs and Induſtry. The Conſideration whereof having of late exerciſed "our Mind, who always eſteem our People's Good our neceſſary Contemplations; we have received, as well by the Diſcourſe of our own "Reaſon, as by Information gathered from others, that the making of Silk "might as well be effected here as it is in the Kingdom of *France*, where the "ſame hath of late Years been put in Practice; for neither is the Climate "of this Iſle ſo far diſtinct or different in Condion from that Country, "eſpecially from the hither Parts thereof, but that it is to be hoped that "thoſe Things, which by Induſtry proſper there, may by like Induſtry "uſed here have like Succeſs; and many private Perſons, who for their "Pleaſure have bred of thoſe Worms, have found no Experience to the "contrary, but that they may be nouriſhed and maintained here, if Proviſion were made for planting Mulberry-Trees, whoſe Leaves are the "Food of the Worms. And therefore, we have thought good hereby to "let you underſtand, that altho' in ſuffering this Invention to take Place, "we do ſhew our ſelves ſomewhat an Adverſary to our Profit, which is "the Matter of our Cuſtoms; for Silk brought from beyond the Seas, "will receive ſome Diminution: Neverthele ſs, when there is a Queſtion "of ſo great and publick Utility to come to our Kingdom and Subjects "in general, and whereby (beſides Multitudes of People of both Sexes "and all Ages) ſuch as in regard of Impotency are unfit for other Labour, may be ſet on work, comforted and relieved; we are content

" that our private Benefit ſhall give way to the publick. And there-
" fore, being perſuaded that no well-affected Subject ſhall refuſe to put
" his helping-Hand to ſuch a Work, as can have no other private End
" in us, but the Deſire of the Welfare of our People; we have thought
" good, in this Form only, to require you, as a Perſon of greateſt Au-
" thority in that County, and from whom the Generality may receive
" Notice of our Pleaſure, with more Conveniency than otherwiſe, to
" take Occaſion, either at the Quarter-Seſſions, or at ſome other pub-
" lick Place of Meeting, to perſuade and require ſuch as are of Abi-
" lity (without deſcending to trouble the Poor for whom we ſeek to
" provide) to buy and diſtribute in that County the Number of Ten
" Thouſand Mulberry-Plants, which ſhall be delivered to them at our
" City of, *&c.* at the Rate of Three Farthings a Plant, or at Six Shil-
" lings the Hundred, containing Five-ſcore Plants. And becauſe the
" buying of the ſaid Plants at this Rate, may at the firſt ſeem charge-
" able to our ſaid Subjects, (whom we would be loth to burthen,) we
" have taken Order, that in *March* or *April* next, there ſhall be deli-
" vered at the ſaid Place a good Quantity of Mulberry-Seeds, there to
" be ſold to ſuch as will buy them, by Means whereof the ſaid Plants
" will be deliver'd at a ſmaller Rate than they can be afforded being
" carried from hence. Having reſolved alſo, in the mean time, that
" there ſhall be publiſhed in Print a plain Inſtruction and Direction,
" both for the increaſing the ſaid Mulberry-Trees, the breeding of the
" Silk-Worms, and all other Things needful to be underſtood for the
" perfecting a Work every way ſo commendable and profitable, as well to
" the Planter as to thoſe that ſhall uſe the Trade. Having now made
" known unto you the Motives as they ſtand with the Publick Good,
" wherein every Man is intereſted, becauſe we know how much the Ex-
" ample of our own Deputy-Lieutenant and Juſtices will further this
" Cauſe, if you and other your Neighbours will be content to take ſome
" good Quantities hereof to diſtribute upon your own Lands, we are con-
" tent to acknowledge thus much more in this Direction of ours, that all
" Things of this Nature, tending to Plantations, Increaſe of Science, and
" Works of Induſtry, are Things ſo naturally pleaſing to our own Diſpoſi-
" tion, as we ſhall take it for an Argument of extraordinary Affection to-
" wards our Perſon; beſides the Judgment we ſhall make of the good
" Diſpoſitions in all thoſe that ſhall expreſs in any kind their ready Minds
" to further the ſame; and ſhall eſteem that in furthering the ſame, they
" ſeek to further our Honour and Contentment, (having ſeen in a few
" Years paſt that our Brother the *French* King hath, ſince his coming to
" the Crown, both began and brought to Perfection the making of Silks
" in his Country, where he hath won to himſelf Honour, and to his
" Subjects a marvellous Increaſe of Wealth,) would account it no little
" Happineſs to us, if the ſame Work which we began among our People,
" with no leſs Zeal to their Good than any Prince have to theirs, might
" in our Time produce the Fruits, which there it hath done. Wherefore
" we nothing doubt but ours will be found as tractable and apt to further
" their own Good, now the Way is ſhew'd them by us their Sovereign,
" as thoſe of *France* have been to conform themſelves to the Direction
" of their King.

Given under our Signet at our Palace of Weſtminſter, Nov. 16. *in the Sixth Year of* England France *and* Ireland, *and of* Scotland *the Two and Fortieth.*

By this may be ſeen the Sentiments of that Prince One Hundred Years ago, and what wiſe Diſpoſitions were made for the future Glory and Riches of the *Engliſh* Nation. Something was done agreeable to theſe Royal Exhortations; but for want of Order, and an eſtabliſhed Company of Undertakers, little came of it; and the ſucceeding Troubles in the next Reign ſoon ſtifled all the beſt formed Schemes for the Publick Good.

As we have now a Prince reigning over us, who, by all his Actions and wiſe Adminiſtration, hath demonſtrated that he wants neither Will nor Power to do us Good, and to promote the Intereſt and Happineſs of his People; ſo we may have Reaſon to hope that ſome time or other, this among the reſt will be thought a probable and reaſonable Scheme, whereby to acquire Honour to himſelf, and an Increaſe of Riches to his Subjects.

Of FISH-PONDS.

FISH-Ponds being of ſuch ſingular Uſe and Service to every Gentleman's Eſtate and Family, it will be expected ſomething ſhould be ſaid of them, that may direct either the *making* or *preſerving* or *ſtocking* them. It is then to be taken Notice of, that the low moory Grounds where *Sedge* and *Ruſhes* are wont to grow, are on all Accounts the beſt for Ponds; for if you conſider that the Soil there, and what grows upon it, is not worth much; that when it is made a Fiſh-Pond, it receives all the Waſh and white Water of the Uplands, which is ſingularly good for Nouriſhment and Increaſe of Fiſh; and alſo that there, if any where, will be Water found and preſerved, even in the drieſt Summers. I ſpeak not here of ſuch as have Springs conſtantly to feed them: That is a ſeparate Conſideration, and requires ſeparate Advice. But if we expect Fiſh to be large and fat, this is the Situation deſirable for a Fiſh-Pond of every Dimenſion; but great Care ſhould be had that it be deep enough and large enough for the Stock of Fiſh it contains. Depth is abſolutely neceſſary to preſerve the Fiſh both from the Summer Heats and Winter's Cold; the laſt eſpecially, which oftentimes proves fatal to the Fiſh for want thereof. The general Depth ſhould be ſix Foot; and in ſome Places, chiefly towards the Head, ſomething more; but the deeper the better.

The Head of the Pond, where the Sluice is to be ſet, will naturally fall to be on the loweſt Ground, and ſhould be made ſo, that, if poſſible, the Water upon Occaſion may be drawn off pretty ſwiftly. The Difficulty of theſe Ponds made in the loweſt Grounds, is, that as they receive proper Nouriſhment from Excrements, *&c.* ſo in time the Settlings of the ſame will bring on a Neceſſity of ſcouring and cleaning them, which ſhould be done once in Ten or Twelve Years. But this Neceſſity brings Riches along with it; for the Mud taken out will more than repay the Charge when it it is ſpread on the Uplands. This Neceſſity alſo brings on another, of having more Ponds than one, wherein to beſtow the Fiſh while that Work is doing.

The right Contrivance therefore is to begin the String of Ponds where there is a ſmall feeding Rill or Spring for a Command of Water for all below it, where there are no Springs; and then there will be proper Places aſſigned for each ſort of Fiſh, and for both Ways of managing them. The ſharp Water, where the Springs are, will never *feed* Fiſh; and the thick Water, where no Springs are, will never *breed* them well: which ſhould be well and conſtantly regarded to prevent Diſappointments.

If you happen to be at any conſiderable Diſtance from breeding Ponds, there are ſome Difficulties in procuring a young Fry, and to bring them alive for the *ſtocking* of Ponds. *Jacks* and *Pearch* are very difficult to carry ſafe above Two or Three Miles; but *Carp* and *Tench* will live better and much longer out of their own Element, and being lapt up carefully in clean Straw (which by the way is either better than Hay or Graſs) have been known to be carried alive Fifteen or Twenty Miles; but neither is that to be depended upon, except in a moiſt Air. Some therefore have thought, that the beſt way to ſtock Ponds at a Diſtance, is with the *Spawn* of the ſeveral Sorts of Fiſhes, which may be carried with more Safety Twenty or Thirty Miles: But as I have had no Experience of the Succeſs of this, I can only recommend it to be tried by the Curious.

After the Pond is ſufficiently ſtock'd with proper Fiſh, ſome put Bavins or green Faggots in two or three Places, ſtaked down as a Shelter for the Fiſh on all Occaſions, and wherein they will lay their Spawn with more Safety. It is better to *under* than to *over* ſtock; for Fiſhes of all Creatures are the greateſt Increaſers; both the Sea and the Rivers would ſoon be overſtocked, did not Providence ſo order it that the *Greater* ſhould devour the *Leſs*. Three Spawning *Carps* put into a Pond of Three Acres, and Nine or Ten Milters with them in *February*, were known to produce in *November* following no leſs than Nine Thouſand young Fry. And a *Bream* is thought to increaſe in Number much more.

But yet great Care is to be taken to manage this Affair with Prudence too, *viz.* to let the great Invaders, the Fiſhes of Prey, ſuch as *Pike* and *Pearch*, be in a Pond by themſelves; for they will ſoon devour every Fiſh that is valuable, and even their own Kind too, if any thing ſmaller than themſelves: However, *Roaches* (worth little of themſelves) that are great Breeders are induſtriouſly put in with no other view but for *their* Prey. In *Cambridge*, where the beſt Pikes are, and where they have Plenty of Eels, *theſe* are their conſtant Food; by which, being cut in ſhort Pieces, they feed them daily, and make them both large and fat.

The *Pearch* is a moſt excellent Fiſh; a Fiſh of Prey too: But not ſo much encouraged as he deſerves; for, with good Keeping and Time, he will arrive to two Foot in length, and be little inferior to a Trout in Goodneſs. His chief Food is *Minims* and *Gudgeons* or *Worms*, or indeed any other of the ſmaller Fry of Fiſh. But it ſhould be taken Notice of here, that there are two kinds of *Pearches*, which in no ſort differ from one another but in their Bigneſs; the one of them (as hath been ſaid) will be very large; but the other, tho' it live Twenty Years, will never be above Five or Six Inches long. The Truth of this I have had Experience of myſelf; and I believe it is that which hath diſcouraged many from ſtocking a Pond with *Pearch*, happening to meet with the ſmaller ſort, which indeed is the moſt common one: I need not therefore ſay how this Diſappointment may be remedied with Care.

Carp and *Tench*, eſpecially when they come to be Twenty or Twenty Four Inches long, are univerſally admired as the beſt of freſh Water Fiſh, and eat much better out of *Ponds*, where they are fed, than *Rivers*. It is not above Two Hundred Years ſince the *former* of theſe was naturalized in *England*, being a Foreigner and brought firſt out of *Germany*. When they are ſmall they are a very mean Fiſh, and full of little troubleſome Bones; but when they grow bigger, they are fleſhy, ſweet and high taſted, growing fat with a little Care and Aſſiſtance of refuſe Food from the Kitchen or coarſe Paſt; and if it be frequently given, they will in time grow ſo tame and familiar, as even to take the Paſte or Bread out of the Hand; which, as it muſt be a Diverſion and pleaſant Amuſement, ſo that Pleaſure will ſoon be rewarded with one of the beſt Diſhes at an Entertainment.

But the Method of fatting Carp, mentioned by the ingenious Mr. *Derham*, ſhould not be omitted here: In *Holland*, (and it hath been practiſed in ſeveral Places in *England* too) they hang the Carp, intended to be fed, in a Cabbage-Net in the Cellar, wherein they put clean Straw or Graſs; through the Holes of which they feed the *Carp* daily with white Bread and Milk ſweetened with Sugar, which in leſs than a Fortnight's time will make them exceedingly fat: But it ſhould be obſerved, that when the Carp ſometimes begin to be ſick for want of their own Element, the Cabbage-Net muſt be dipt in Rain or River Water for a quarter of an Hour, and that will preſently revive them.

Neither the *Carp* nor *Tench* are Fiſhes of Prey; and therefore they thrive beſt in thick Water and ſtanding Pools, where little or no Springs are; where they have Depth of Water, ſome Mud for ſhelter, and ſome Shallows, where they can come at Graſs and Weeds. The Breeders ought to be kept by themſelves, in Ponds that have gravelly or ſandy Bottoms; and, if poſſible, that are fed with Springs: But one ſmall Pond of this kind is ſufficient; for (as I have ſaid) they are great Increaſers.

The Young Ones out of theſe *breeding* Ponds may be taken with great Facility and Pleaſure, by the Angle and Hook baited with a ſmall red Worm; but the larger Sort out of the *feeding* Ponds are more ſhy and not ſo eaſily taken, except they by Uſe be brought to the Hand. A *Caſting Net* will ſometimes ſurprize one or two of them at the firſt Throw; but afterward (if there is any Shelter of Mud) you will find it labour in vain; for upon every ſuch Diſturbance of the Water, they immediately ſtrike their Heads into the Mud, and ſo the Nets draw over their Tails without laying hold of them. The Angle baited with a Dew-worm will, at ſome certain Times before and after Rain, tempt here and there one to take the Hook; but the beſt and ſureſt way to take the larger Sorts of Carp and Tench is by Bow-nets and Tramels ſunk here and there to the Bottom by Stones.

The *Trout* (one of the beſt of freſh Water Fiſhes) is very impatient of Confinement, being by the Shape of its Body long and ſlender; and the Strength and Elaſticity of its Tail, made for Swiftneſs and Velocity to follow and overtake its Prey: However, there have been Ways found to make Confinement tolerable, and to make it even thrive in a Priſon: As when a Contrivance is made to carry the Stream of a River in a Semicircle thro' one Grate and out at another, admitting the ſmaller Fry of Fiſh into the Priſon for their Prey, and ſuffering none of the *Trout* to eſcape. By this means I have ſeen *Trout* at *Salisbury*, in the Garden of my Friend Mr. *R. Thorp*, above Two Foot long, every one of which he could at any time command as an Entertainment for his Friend. Otherwiſe it is to no purpoſe to put *Trout* into ſtanding Waters; for there they will neither breed nor thrive, but generally languiſh and pine away; or if they do live, they have nothing of the delicious Taſte of a River *Trout*.

Bream, *Roach*, *Chubs* and *Barbel* are hardly worth preſerving in Ponds. The firſt indeed in deep Waters will grow to a very great Size; but then they are generally Five or Six Years before they are a Foot long; and till they are very large they are hardly to be eaten, being full of Bones and inſipid; and even when they are full grown, to the Age of Fifteen or Twenty Years, they are never reckoned a Delicacy. *Eels* indeed will grow to a monſtrous Size in Ponds and muddy Waters; but then they have a yellow Countenance and muddy Flavour, not comparable to thoſe taken out of Rivers, which have Silver Bellies and a pleaſant Taſte.

The *Pike* is found by Experience to anſwer every way beſt in Ponds, where he can have Plenty of Prey or other Food; and it is not uncommon to take *ſuch* an Ell long. It is obſerved that he doth not care to ſeize upon any thing unleſs it *ſtirs*, whereby he takes it to be alive. After every thing that is *ſuch* he is perfectly voracious, and devours almoſt every living Thing that comes in his way, whether it be Fiſh or Frogs; nay, even young Goſlings and Ducks they will make no Difficulty to ſeize and devour; which the Farmer's Wife is to take Notice of as a Caution.

I remember, once angling with a pretty ſtrong Line for a *Pearch* with a live *Minim*, it happen'd that as ſoon as the Pearch had gorged the *Minim*, a middling *Jack* came and ſeized both; which I ſoon perceived, and therefore let him alone with his Prey, till I thought I had him ſafe: However, as I was pulling out my gladſome Prize, there came a *Pike* ſomething bigger than that I had at my Line, and had like to have deprived me at once of a ſingular Treaſure I had ſet my Heart upon. I mention this, to ſhew that the Pike will not only ſeize on thoſe of his own Kind, but even on ſuch as is not much his Inferior, ſwimming about with his Prey in his Throat till he can gradually digeſt it.

The Pike grows exceedingly above all other Fiſh, if he have his Fill of Prey without much labouring for it. From Five or Six Inches he will arrive to Twelve or Fourteen the firſt Year, and the next to Twenty three or Twenty four Inches long, and proportionably thick. When his Head is *ſmall*, his Belly *round* and *plump* and has withal a *Yellow* Caſt, theſe are plain Indications that he is fat and in good plight. The Difference of the Nature of Soils makes a great Difference in the Growth and Thriving of Fiſhes: For as the Fertility of ſome Soils nouriſhes double the Number of Cattel which others will do; ſo of Ponds it is found by Experience, that if the natural Soil is a fat Clay, Marle or loamy Earth, they will nouriſh and maintain double the Number of Fiſh that lean Heath-Ground or hungry Sand and Gravel will do; which laſt therefore may be much helped with the Drains from the Slaughters of Butchers, or even from Blood, Guts and Garbage themſelves; on which *Pearch* and *Eels* will deliciouſly prey, if eſpecially they are cut in ſmall Pieces.

Indeed moſt Sorts of Fiſh, except Pike, will live in a manner in any Pond, and without any Feeding or Induſtry, as aforeſaid; but then, as they are forced to live upon the Mud, Earth, and Weeds, that grow in ſuch Ponds, ſo it muſt not be wondered at that they *taſte* accordingly.

I am aware that it is the common Practice to plant Trees, Elms, Aſhes, &c. on the very Edges of the Banks of Fiſh-Ponds, with a View of Shelter and Shade; but I am very well ſatisfied this is a Miſtake, and doth a great deal of Harm, eſpecially if the Trees are many, and ſet ſo near and projecting as to drop all or moſt of their Leaves into the Pond. I have known a Pond of clear wholſome Water ſo poyſoned with Leaves, that not a Fiſh of any ſort would live in it; but after it was cleaned and the Trees removed, it proved an excellent breeding Pond. Shelter indeed is right, and of uſe at ſome Diſtance to defend the Ponds from violent Winds and the Severity of Black Froſts; but the Branches of large Trees projecting, ſo as to drop the Wet and Leaves into the Pond, ſhould not be ſuffered, except here and there a *Willow* for a little Shade in extreme Heats, whoſe Leaves do the leaſt Harm.

And now I mention the *Froſt*, I muſt caution likewiſe againſt a common miſtaken Practice very hurtful and fatal to Fiſhes; and that is, the breaking the Ice in hard Weather under a Notion of giving them Air in thoſe Extremities. Whereas, if it could be ſuppoſed (which is very much doubted) that Fiſh in ſuch Caſes die for want of Air, the Practice of breaking the Ice doth but deceive them, and draw them into greater Danger: For whilſt they are at the Mouth of ſuch Holes, (invited thither perhaps by Light and more Room,) they are frequently ſurprized with the Severity of the Cold, and there are found frozen to the lower Surface of the Ice; whilſt thoſe at the ſame Time which retire to the Deeps, and it may be almoſt cover themſelves in the Mud, eſcape and out-live the greateſt and longeſt Froſts.

Several Obſervations have been made of the Lives of Fiſhes; by which it appears that all or moſt of them are very long-lived, from the leaſt to the greateſt; and that the *Carp* particularly has lived near an Hundred Years. Moſt of them are *oviparous*; but the biggeſt of them, the *Whale*, is *viviparous*, bringing forth young ones (commonly two only) which ſhe ſuckles; and ſome think the Eel is *viviparous* too. They ſeem to enjoy the Power of Senſation as perfectly as Animals that live in the Air. And as to their *Sight*, there can be no Diſpute; for they ſeem to exceed in the Quickneſs of that Senſe many other Animals; and by their chuſing ſome Baits and refuſing others, neither *Smelling* nor *Taſting* ſeem to be wanting. The Senſe that comes moſt in Queſtion, and has been diſputed, is that of *Hearing*; but if the Experiment Mr. *Bradley* mentions to have been made at *Rotterdam* by himſelf and a Friend of his, was rightly and truly carried on without *Motion*, it may ſatisfy us that neither is that Senſe wanting.

" The Gentleman having filled his Pocket with Spinage-Seed, with " which he was wont to feed his Carp, they both came to the Side of " the Mote, which was of conſiderable Extent, ſtanding mute for ſome " Time, the better to convince him that the Fiſh would not come till " he had called them. At length, being deſirous to ſee the Event, he " *called* in his uſual Way, and immediately the Fiſh gathered together " from all Parts of the Mote in ſuch Numbers, that there was hardly " room for them to lie by one another, and then he flung ſome Spinage-

" Seed amongſt them, which they devoured very greedily: Nay, he " tells us what is more conſiderable ſtill, that at Sir *William Bowyer*'s " near *Uxbridge*, there is a Pond of *Pikes* or *Jacks*, which are a much " more wild and untamable Fiſh than the *Carp*, and *theſe* they uſually " *call* together at Pleaſure to feed.

Since it is ſo very neceſſary that all Fiſh-Ponds ſhould ſometimes be freed from their Filth and Mud, for the better Preſervation and Increaſe of the Fiſh, it may not be amiſs to advertiſe, that for Conveniency the beſt Way is to make the Ponds long and narrow, and not ſquare, that the Workmen may at One or Two Throws at moſt be able to caſt the Mud out on the Banks; for the Price of which ſort of Work, every Pole Square of Mud, a Foot deep, is worth 6 d. a Pole to fling out, where it may be done at one Throw; but where two is required, it is worth 12 d. a Pole.

Of MINES, MINERALS, *and* QUARRIES.

NAture's Riches, and the Improvements to be made and raiſed from the Earth, are by no means to be confined to the *Surface* thereof. The Earth's *Bowels*, as well as the *Superficies*, are hidden Treaſures, made to be explained and laid open for Man's Uſe; for the Exerciſe and Labour of *Some*, and for the Riches and Accommodation of *Others*.

It hath been a long Time a Diſpute among the Learned, whether Minerals, Stones, and Metals, *grow* and *vegetate*; whether they admit of any gradual Increaſe, as Vegetables or Animals; becauſe no Obſervations made within the Compaſs of Man's Life and Memory, will give the leaſt Light for any Diſcovery. That ſome of the hardeſt *Stones* and *Marbles* at this Day found in the Bowels of the Earth, were once ſoft like Mud, and capable of receiving heterogeneous Bodies into their Compoſition, is, I think, plain to a Demonſtration, from the frequent Mixture of various Shells, Fiſh-Bones, Bits of Plants and Animals, found even in the hardeſt Parts of their Subſtances: But, whether, when they are thus once conſolidated, they afterwards admit of Growth or Increaſe, is not ſo eaſy to determine. The Veins of Metals forming themſelves between the Rocks and different *Strata* of Earths, like Branches of Trees, ſtrongly tempt one to imagine, that they do really grow like Plants, and receive Augment from *Exſudations*, and the minute and looſe Parts of Mineral Matter, gradually cohering to their outward Subſtances.

It is true, the Proceſs of Nature in this Sort of Vegetation is ſo ſlow, that Five Hundred or Six Hundred Years, or perhaps as many Thouſands, will give no manifeſt Proof or certain Indication of the Augment and Increaſe of Minerals; but if they grow and vegetate, (as there is all the Reaſon in the World to think they do,) there is no Neceſſity that the *Time* of their Growth ſhould be limited by ſuch Periods as we are wont to aſſign to other Vegetables. We may go back, if we pleaſe, for *Time* as far as the *Moſaic* Creation, aye and as many Thouſand Years beyond it, as the Neceſſities of Nature may be thought to require: For it is agreed by all, but thoſe whoſe Education hath too much ſtraitened their Way of Thinking, that the Beginning of *Time*, of Days and Years, reſpect only the *Inhabitants* of this World; and that when *Moſes* tells us God *made* this World, he did not (then at leaſt) *make it out of nothing*; but, to anſwer the wiſe Ends of his Providence, *made* it a terraqueous Globe, a fit Habitation for ſuch a Creature as Man, for a determinate Number of Years unknown to us. But who ſhall go about to limit the Almighty Power, Wiſdom and Foreknowledge of God, with reſpect to what hath gone before, or what ſhall follow after. He has wiſe Ends to ſerve by all the Revolutions and Changes of Planets, Comets, and fixt Stars; and knows how to adapt them, ſo as to ſerve the Purpoſes and anſwer the Neceſſities of his Creatures.

Neither doth this Way of Thinking in the leaſt weaken the Authority of *Moſes*, in his Hiſtory of the Creation; which was manifeſtly and wiſely formed *ad Captum Vulgi:* He certainly ſpoke and wrote (as he ought) not like a *Philoſopher*, but as a *Lawgiver*; and prudently compiled and worded his Hiſtory agreeable to the Capacities and Underſtanding of the *Jews*, for whoſe ſake he chiefly wrote it; not always * perhaps as Things *were* in themſelves ſtrictly and properly ſpeaking, but rather as they *appeared* to be; ſtill with this conſtant View, to magnify the Power and Wiſdom of God.

So that, to return to what we were ſaying, if Iron, Lead, Copper, Silver, or even Rocks of Stone of all kinds, &c. grow no more in a Thouſand Years, than an *Oak* doth in One ſingle Year, this may ſtill be called *growing*; and though their Subſtances are bulky, and their Veins far extended, yet ſince we are not bounded by Years nor Time in our Imaginations, we have ſtill room left in our Minds to proportion the one to the other; becauſe, whatever Alterations the outward Surface of the Earth may have ſuffered and undergone, we have no Reaſon to think its inward Parts have been much changed.

Leaving then this Diſpute about the Growth of *Minerals*, let us next ſee what it is that Nature generally affords us in the Bowels of the Earth in this our Iſland; which I believe muſt be allowed to be richer in this Article alſo, than any other Part of the Globe of the like Extent. We have ſome *Gold*; more *Silver*, and *Copper*; and Plenty of *Iron*, *Tin*, *Lead*, *Coal*, *Allum*; beſides vaſt Varieties of *Marble* and *Stone*, which afford Materials for Building, and all the uſeful and ornamental Purpoſes of Life. But, as I have obſerved that this Iſland is ſingularly rich in *Mines*, ſo I muſt alſo with Pleaſure take Notice, that the Biſhoprick of *Durham*, though a ſmall County, contains greater Variety and Plenty of theſe Riches in its Bowels, than any one Part of the Kingdom beſides: For throughout the Middle of this County, from the Sea-ſide to the Weſtern Parts, run ſeveral Ridges of Mountains of great Extent, ſtored with Plenty of the beſt *Lime-Stone* in *Europe*; which is eagerly ſought for and fetched by thoſe diſtant Country-men, who are unfortunately deſtitute thereof, for the Purpoſes of Building, and manuring their Land.

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* *Thus (among many other Inſtances which might be given) we know by all Experiments and Diſcoveries, that the* Moon, *like our* Earth, *is a dark Body, borrowing and reflecting all that Light we ſee, from the* Sun. *And yet* Moſes *ſaith,* God made two great Lights, the greater to rule the Day, and the leſſer the Night; *only becauſe the Moon* appeared *to be a Light.*

In the *Weſtern* Parts, where theſe Riches fail, there Nature hath ſupplied them with Plenty of *Lead* in divers Places, eſpecially about *Stanhope* and *Aukland*, &c. out of which is extracted a conſiderable Quantity of *Silver*. All which employs a great many Hands, and makes the Country both populous and rich. And then again, where theſe Treaſures are wanting, in almoſt all the flat Country, and eſpecially near two Navigable Rivers, the *Tine* and the *Were*, there are found thoſe inexhauſtible Mines of Coal, for which there is a Demand from almoſt all Parts of *Europe*. But becauſe I ſhall have occaſion to ſay more of this preſently, I will only add further, that beſides all this, there are almoſt every where found Quarries of excellent Stone, as fine as *Portland* or *Ketton*, which make the moſt beautiful Floors and Chimney-Pieces.

And now I am ſpeaking of the Beauty and Excellence of the ſeveral Quarries of Stone dug in the Biſhoprick of *Durham*, I cannot but obſerve that *theſe* alſo are frequently found upon or near the navigable River *Were*, which runs to *Sunderland*; by the Help of which, we are erecting and carrying on at the Mouth of the Harbour, a magnificent and beautiful *Pier*, by virtue of a ſmall Duty laid upon Coals; which at once demonſtrates the Uſe of it for Navigation, as well as the Riches of the Country. It is to be Four Hundred Yards long in a ſmall Curve, and Eight Yards wide; its Sides neatly jointed and ſmoothed; and the Surface a little inclining, is paved with the ſame fine-grained Stone, with which we make Floors and Chimney-Pieces; and on that Side moſt expoſed to the Tide, is erected throughout a handſome Breaſt-Parapet-Wall, which adds much to its Uſefulneſs and Beauty. The Whole is carried on by Commiſſioners; who have committed the Care and chief Contrivance of the Work to Mr. *Lellum*, an able and expert Engineer. It is not yet quite half finiſhed; and before it is compleated, there will be expended little leſs than 20,000 l. And although this is a Burthen which will ſcarcely be felt, it will raiſe ſuch a goodly Pile of Stone, as muſt be the Admiration of All, though poſſibly mixt with a little Envy in Some.

But, that I may proceed a little methodically in this *Chapter* of *Mines*, I ſhall ſpeak diſtinctly of the ſeveral Kinds; not ſo much to ſhew the Methods of winning them, (which would lead me too far beyond my Purpoſe,) as to ſhew the Variety of hidden Treaſures, which lie couched in Nature's Bowels.

And becauſe *Gold* and *Silver* are with us ſeldom found in any Quantities, but as they are ſometimes mixt with other Metals; I ſhall firſt ſpeak of *Copper*.

Of COPPER.

WHICH is a natural Metal growing in the Earth without any kind of Mixture, or other Help by the Art of Men; and it is of the middle Value, of a reddiſh Colour, and the firſt Material of Money.

England hath divers Copper Mines. At *Kenſwick* near *Scotland* great Quantities of Copper have been dug: Some Mines of Copper Oar have been found in *Yorkſhire*; there are ſome Mines in *Staffordſhire* that produce excellent Copper Oar; and in the Weſt of *England* and in *Wales* there are good Oars. In the *Staffordſhire* Mines, the Veins of Copper lie from Eight to Fifty Yards deep; but all dipp'd on the North-Eaſt: The Proprietors break the Rocks with Gun-powder, and get three ſorts of Oar, *viz.* a *Black* the beſt, a *Yellow* the worſt, and a *Mixture* of both; which in Times paſt they ſmelted at *Ellaſton*, where they had Mills, *&c.*

In *Derbyſhire* there are alſo Mines, near the *Peak*, out of which they dig Oar; and when they have waſhed the Lead Oar in a great Vat, they caſt the Refuſe upon Heaps; which of late Years has been dug up again, and certain heavy Lumps, which were not Lead Oar, picked out. Theſe are put in Casks and ſent to *Hull*, and thence to *London*; and out of theſe, when refined, very good Copper is taken.

At *Trevaſcus* in *Cornwall*, I am informed, there has been dug more than One Thouſand Tuns of Oar; there is one Spot of Thirty Two Foot broad and Eight Foot deep, and how long none can tell, of this Oar. We have lately found out the Art of Calcining the Oar with Reverberatory Furnaces and Pit Coal. At the greateſt Copper Works in *Hungary*, the Body of the Copper being ſtrongly united to its Oar, (the Separation whereof is very difficult) the Oar is burned and melted Fourteen times: And they get Silver, by adding Lead to the Copper when melted; and when Cold they give a ſtrong Fire again, as it lies on Croſs Bars, until both melt and fall through; and when the Copper has paſs'd its laſt Melting, they cut it in Pieces fit for Uſe.

There are many Samples of Copper Oars in *Greſham* College, as *Yellow*, *Black*, *Maſſy*, *Native*, *Capillary*, *&c.* brought thither from many Parts of the World, as well as *England*.

Every one knows Braſs is made from Copper mix'd with *Lapis Calaminaris*, *&c.* which is found in greateſt Quantities in *Germany*; and ſome is ſaid to be found in *Somerſetſhire*.

Of TIN.

IN the *Philoſophical Tranſactions*, there are large Accounts of *Tin-Mines* in *Cornwall* and *Devonſhire*. And in *Greſham College* there are Specimens of Tin Oars of ſeveral Colours, *viz. Blackiſh*, *Browniſh*, *Purpliſh*, *Reddiſh* and *Yellow*; ſo good that they need little or no Preparation by Stamping or Dreſſing for Blowing: Neither is there any conſiderable Waſte in Melting.

Dr. *Plot*, in his *Hiſtory of Staffordſhire*, ſays, that at *Walſall* they make a great Variety of *Iron* Wares; in perfecting whereof they uſe a great deal of Tin, which they ſuperinduce over them, to give a better Luſtre and preſerve from Ruſting, and to prevent others from giving a Taſte of the Metals to Things boiled in them: For Performance whereof they uſe Methods and Materials proper for each Metal, *viz.* for Iron, they melt in a Pan Tin and Yellow Roſin, which will ſwim above the Tin the Thickneſs of a Crown-Piece; into which the Wares being firſt ſoaked in old ſharp clarified Whey to cleanſe them from all Filth, and duly beaten, and then dip'd into this Mixture, being ſhak'd about by Mediation of the Roſin, they become *Tinned* all over: And for Tinning ſmaller Braſs Wares, they put them all together in an Earthen Pot, and heat them over the Fire to a due Proportion; then put in a ſuitable Quantity of Tin, and when it is melted they caſt in ſome *Sal Armoniac*; by Mediation whereof the Braſs admits the Tin, which when ſhaken together, the Work is finiſhed.

In *Tinning* Copper they uſe the ſame Methods, only inſtead of *Sal Armoniac* they uſe *Black Roſin* to unite the Metals; with which they rub the Veſſel all over, and then apply the Tin, and ſo proceed as above. That the Operations *are* ſo, all our Workmen muſt know; but *why* theſe Materials, above all others ſhould perform theſe Feats, is a Queſtion perhaps hitherto *unpropoſed*, much leſs *determined*. But,

The great Uſe of Tin is to make Pewter with; which is a Mixture of Three, Four, Five or Six Pound of Copper to One Hundred Weight of Tin; and the finer the Tin, the more Copper. To take off ill Colour, is ſometimes added a few Ounces of Spelter, and of this ſort of Mixture are made Diſhes and Plates; but Pots for Meaſure, Chamber-Pots, *&c.* have an Allay of Lead in them, being a coarſer Compoſition of Metals.

Pewter is light and porous, therefore it is hammer'd much to make it cloſe and ſerviceable: Dyers Vats are made of it. *Tin* mixed with Copper, in Proportion as Two to Seven, makes Metal for Bells, Organs, *&c.*

Of IRON, *and* IRON-WORKS.

IRON, Biſhop *Wilkins* ſays, is a Mineral of a hard Conſiſtence, *cloſe, ductil, fuſil*; it is reckoned among the perfect natural Metals, ſuch as of themſelves grow in the Earth, without any kind of Mixture, or other help by the Art of Men; and it is of a more baſe and common ſort, being the uſual Matter for Weapons and Tools.

Of *Irons* there are many Sorts at *Greſham College*, as *Bruſh Iron*, *Iron Oar*, *Iron Stone*, *&c.* dug in *Glouceſterſhire* in the Foreſt of *Dean*, and in *Wiltſhire*, *Herefordſhire*, *Monmouthſhire*, *&c.* and Dr. *Plot*, in his Hiſtory of *Staffordſhire*, tells us, that in Digging for *Iron Stone* they meet firſt with a ſmall Baſs, then a ſtrong Baſs, then a Stone from its Colour called a Blue Cap; and after that the Iron Stone of a darkiſh blue Colour, which ordinarily lies there not above Two Foot in Thickneſs.

On *Mear-Heath* they obſerve, in Digging for Iron Stone, that if they meet with Rocks, Sand, Gravel and Clay, that the Head of the Mine is quickly eaten out; eſpecially the laſt, which ſo keeps down the Head, that it comes to nothing preſently; all which they count bad, the Works being thinner and more chargeable to dig: But if they meet with Mine-Earth which is white; then they promiſe themſelves good Mines both of *Iron-Stone* and *Coal*, which, as at moſt other Places, lie here together; the *Stone* above the *Coal*, between Four Fingers and half a Foot thick, having Baſs above and below it; in which they meet an Iron Oar call'd Ball Stones diſtinct from the Vein, and then indeed it is thicker. Where Iron Stone and Coal lie together, they call it the deep Mine; which is not the beſt, the chalky Mine and the little Mine being preferred before it.

About *Dudley*, where the Iron Stone lies under Ten Yards Thickneſs of Coal, and above the Heathen Coal of a conſiderable Thickneſs, it is divided into divers Meaſures of different Denominations; as the *Black-Row*-Grains, the *Dim-Row*-Grains, the *White-Row*-Grains; all ſo call'd from Earths of thoſe Colours in which they lie; the *Rider-Stone*, the *Cloud-Stone*, the *Bottom-Stone*, *&c.* At *Walſal* and *Ruſhal* they divide their Iron Oar into *Black-Bothum*, *Grey-Bothum*, *Chatterpye*, *Grey-Meaſure*, *Muſh*, and *White-Meaſure*: The two laſt the Principal ſorts, but *Muſh* the beſt of all; ſome of it being a ſmall *Comby* Stone, other ſome round and hollow, and many times filled with a brisk ſweet Liquor, and is ſo very rich an Oar that it may be made into Iron in a common Forge. This ſweet Liquor is thought to be the Matter of Metals before it is coagulated into a metallick Form; for ſome of it being dried pretty hard, and burnt in a Crucible, it quickly maturates into *Iron*.

At the *Orkneys* they are now Digging for *Iron*, where they find it in great Plenty. And likewiſe at many other Places in *Staffordſhire* they dig *Iron Stone*; the ſeveral Meaſures and Sorts whereof have obtain'd different Names, tho' gotten but a very little Diſtance from one another. Of the Oars they make ſeveral Sorts of Iron, differing in Goodneſs according to the Richneſs or Poverty of the Oars, and having their Names ſomewhat agreeable to the Qualities of each Metal: The *firſt* and meaneſt they call *Yellow Share*, a ſort that runs all to Dirt, and is good for nothing; and ſuch is the Iron made of the *Cannock-Stone*, the loweſt Meaſure of Iron Oar about *Dudley*, which is ſo ſulphureous and terreſtrial, that it is not fit to make Iron: This ſort ſome call *Red-Share*, becauſe a Plough-Share made of it will crack in the Red-Heat. The *ſecond* ſort is ſtiled *Cold-Share*; which, tho' it will not break when Red-Hot, yet in Hot-Heat or Cold, the biggeſt Bar of it may be broken with a ſmall Blow upon the Anvil. The Oar for this Iron they have at *Red-ſtreet*, *Apedale*, *&c.* and the only Uſe of this Iron is to make ſmall Two-penny Nails, and Sheathing Nails for Ships, having broad Heads and ſhort Shanks, to keep the Timber from being eaten by Grubs. The *third* ſort is call'd *Blend-Metal*, of which is made large Nails and all ſorts of heavy Ware, ſuch as Hammers, *&c.* and in ſome Parts Horſeſhoes; the Oar comes from *Wednesbury* and *Darlaſton*. The *fourth* and beſt ſort they call *Tough-Iron*, of which the beſt Wares are made, there being nothing ſo good but may be made of this; for which they have their Oar chiefly at *Ruſhal*, and ſome from *Watſall*, but not ſo good: Of theſe Irons they make all their beſt and fineſt Wares *mediately* or *immediately*; for the beſt Iron of all is made out of the Filings and Parings of the Lock-Smiths; which they make up into Balls with Water, and dry them by the Fire till hard, then they melt it in the Fire by Blaſt, licking it up with a Rod of Iron, and then beat it into a Bar, and this they uſe chiefly for *Keys* and other fine Works.

Before the Oar is fit for the Furnace, it is burnt or calcin'd upon the open Ground for Three Days with ſmall Charcoal, Wood or Sea-Coal, to make it break into ſmall Pieces; and this they call *Annealing*, or fitting it for the Furnace. In the mean while they heat their Furnace for a Week's Time with Charcoal, which they call *Seaſoning*; and then they throw the Oar in with the Charcoal, and by two vaſt Pair of Bellows placed behind the Furnace, and compreſs'd alternately by a large Wheel turned by Water, the Fire is made ſo intenſe, that after Three Days time the Metal will begin to run, ſtill after encreaſing till in Fourteen Nights time they can run a Sow and Pigs once in Twelve Hours; which is done in a Bed of Sand before the Mouth of the Furnace.

From the Furnace the Sows and Pigs of Iron are brought to the Forges; which are of two ſorts, but commonly ſtanding together under the ſame Roof; one whereof is called the *Finery*, the other the *Chafery*. In theſe two Forges they give the Sow and Pigs five ſeveral Heats before they are perfectly wrought into Bars. Firſt in the Finery they are melted down as thin as Lead, where the Metal thickens by degrees into a Lump or Maſs, which they call a *Loop*. This they bring to the great Hammer rais'd by the Motion of a Water Wheel, and firſt beat it into a thick Square, which they call a *half Bloom:* Then they put it into the Finery again, and bring it again to the ſame Hammer, where they work it into a Bloom, which is a ſquare Bar in the Middle, with two ſquare Knobs at the Ends, one much leſs than the other, the ſmaller being called the *Ancony End*, and the greater the *Mocket Head:* Then the Ancony End is brought to the Chafery, where after it has been heated a little time it is alſo brought to the Hammer, and there beat quite out to a Bar, firſt at the End; and after that the Mocket-Head is alſo brought to the Chafery, and wrought under the Hammer into Bars of ſuch Shapes and Sizes as are the moſt fitting. Thoſe they intend to be cut into Rods are carried to the Slitting Mills, where they are drawn through Cutters, which are of divers Sizes; and when cold, they are bound into Faggots fit for Sale. And this is much the Method uſed in Sir *Ambroſe Crawley*'s Iron Works near *Newcaſtle*.

In melting of Iron Oar, ſome have great Regard to the Make of the Furnace, and placing the Bellows, and the Hearth of the Furnace into which the Oar and Coall fall. This Furnace is ordinarily built ſquare, the Sides deſcending obliquely, and drawing near one another toward the Bottom like the Hopper of a Mill, where theſe oblique Walls terminate, which is termed the Boſhes. There are joined four other Stones, which are commonly ſet perpendicular, and reach to the Bottom-Stone, making the perpendicular Square that receives the Metal; and theſe, according as they may be pitched, leſs *tranſhaw*, or more *borrow*, will mend or alter the Mixture of the Iron; if *tranſhaw*, or tranſiring from the Blaſt, the Iron will be more cold-ſhear, leſs fined, more indeed to the Maſter's Profit, but leſs to him that has the Manufactory of it; whereas the Iron made in a *Borrow-work* is much more tough and ſerviceable. Nor is the ordering of the Bellows of leſs Concern, which have uſually their Entrance into the Furnace between the Bottom of the Hopper or Boſhes and the Bottom-Stone, and are placed nearer or farther off, according as the Oar and Metal require. It is alſo of Importance in melting of Iron Oar, that there be Five or Six *Sows* made under the Furnace in parallel Lines to the Stream that turns the Wheel, which compreſſes the Bellows, to drain away the Moiſture from the Furnace: For ſhould the leaſt Drop of Water come into the Metal, it would blow up the Furnace, and the Metal would fly about the Workmen's Ears; from which *Sows* they muſt alſo have a *Conical* Pipe about nine Inches at Bottom, ſet to convey the Damps from them into the open Air, which otherwiſe would alſo annoy the Workmen even to Death.

The *hardening* of Iron in *Staffordſhire*, they perform with old Shoes burnt, Urine, and Wood-Soot; and *Brittle hardening* with old Shoes, Tupps-Horns, Bay-Salt, and Argol or Tartar; which harden Iron to the Height, and give it the brighteſt Poliſh. Others ſay, the tougheſt Hardening is made with the Juice of Nettles, Man's Urine, and Linſeed-Oil; and the *Higheſt* of all, by quenching hot Iron in the Juice of *Mouſear*.

But theſe Hardenings have been reckoned only *ſuperficial*; there therefore is another Method, uſed by a Perſon at *Bromley*, to harden whole Bars of Iron *quite through*; the Manner thus: He has a round Oven built of Brick, like a Baker's at the Top, having a Grate in the Bottom near the Middle, about a Foot and a Half or Two Foot wide, where he lays the Coal, on each Side whereof and at the End beyond it he lays his Iron, inclos'd in Coffins made of *Amblecot* Clay, to keep it from melting; the Coffins being proportioned to the Bars of Iron, which are broken into Lengths of between Three and Five Foot long, the longeſt being placed at the End of the Oven, and the ſhorteſt on each Side; each Coffin containing half a Ton of Iron. When the Fire is put to it, it is conſtantly tended Day and Night, till the Operation is perform'd; which, according to the Goodneſs or Badneſs of the Coal, is done in a longer or ſhorter Time, ſometimes in Three Days and Three Nights, other times in Four, and ſometimes not under a Week's Time; the critical Minute in which the Operation is finiſh'd being the great Secret of the Art of making *Iron* into *Steel*.

There are divers Ways of giving a due Temper to Iron; for one Temper is requir'd for drawing it into *Wire*, another for a *File*, another for a *Chiſel*, another for a *Sword*, &c. For the hardening of Iron for Files, this is commended: Take Horſe-Hoofs, or Rams-Horns, and hang them over the Fire till they drop like Glew; take likewiſe Pieces of Leather, and burn them black: Powder them both, and put to them ſtale Urine, and Bay Salt. Let them ſtand together ſome Years, the longer the better. Caſe the Iron with this Mixture, and give it a ſtrong Heat, ſufficient to fuſe the Mixture for three Hours, and then cool it: The Surface of this Iron will be as hard as the hardeſt Steel, and will make excellent Files; but the Hardening reaches not to the Heart of the Iron.

Beſides hardening of Iron, in Iron-works there are frequent Occaſions for ſoftening it; which may be done with *Oil*, *Wax*, *Suet*, *Butter*, *Aſſafœtida*, *Sulphur*, &c. the Iron being daub'd over with any of theſe, and then heated red-hot, and ſuffer'd after to cool in the Fire by degrees, as it goes out of itſelf.

As to the Virtues of Iron of *Ruſma*, (a brown and light Iron Subſtance,) with half its Quantity of Quick-Lime ſteep'd together in Water, the *Turkiſh* Women make their Ointment to take off their Hair whereſoever they pleaſe.

There are many medicinal Preparations of Iron and Steel, all accounted great Alteratives, and Purifyers of the Blood. Nay, it is thought that Steel does good in Dropſies, Green-Sickneſs, ill Habits of Body, and in many other Caſes; but Iron (the chief Virtue whereof proceeds from its Salt) being more porous than Steel, and yielding its Salt eaſier, has been preferr'd in Medicine to Steel.

What gives Virtue to ſome medicinal Waters, is their paſſing through Veins of Steel and Iron.

Of ALLOM.

PErfect *Allom* is a Compound made of a *Stone* dug out of a Mine, of a *Sea-Weed*, and of *Urine*. The *Stone* is ſuppoſed to be found in any Quantity, no where but in the Hills in *Yorkſhire* between *Scarborough* and the River *Teas*, and alſo near *Preſton* in *Lancaſhire*, the ſame being of a bluiſh Colour, and will clear like *Corniſh* Slate. The *Mine* that lieth deepeſt in the Earth, and is indifferently well moiſtened with Springs, is accounted beſt; but too much Moiſture cankers and corrupts the Stone, by making it *nitrous*.

For the more convenient working of the *Mine*, (which ſometimes lieth under a Surface or Cap of Earth Twenty Yards,) they begin their Work on the Decline of the Hill, where they may have the Convenience of Water, and dig down the *Mine* by Stages, to ſave Carriage, and ſo throw it down near the Places where they calcine it.

This Mineral, before it is calcined, being expoſed to the Air, will moulder in Pieces, and yield a Liquor whereof *Copperas* may be made; but being calcined, is fit for *Allom*. As long as it continues in the Earth, or in Water, it remains an hard Stone; but ſometimes a Liquor will iſſue out of the Side of the Mine, which by the Heat of the Sun is turned into natural *Allom*.

The Demand of *Allom* is chiefly from the Tanners and Leather-Dreſſers; and it is alſo a neceſſary Ingredient in the Dyers-Vats; for without it they cannot well *ſet* their Colours. Accordingly, there are great Quantities thereof ſent abroad into Foreign Parts. Neither is it leſs uſeful to the Sugar-Boilers for the fineſt Loaf-Sugars, for ſome phyſical Preparations, and for Salves, *&c.* in Chirurgery.

Of LEAD.

LEAD is a natural Mineral, *cloſe*, *ductil*, and *fuſil*, of the moſt baſe and common ſort, more ſoft than other Metals, and therefore not *ſonorous*. There are of this a great Variety at *Greſham College*; as Chriſtalline Lead from the Mine, Oar rich in Silver, Lead Oar, *&c.*

With *Lead* ſeveral Counties in *England* abound, eſpecially the *North* and *Weſt*; and the *Mendip* Lead Mines (in *Somerſetſhire*) are very conſiderable; but in ſome Counties we hear of none; and not much in *Staffordſhire*, where Dr. *Plot* ſays it is dug in a yellowiſh Stone; and the Workmen diſtinguiſh it into round, ſmall, and ſmithum Oars; the two laſt whereof are beaten to Pieces, and the Oar ſeparated from the Stone, and then waſhed in an Iron Sieve, the better to clear it from Terreſtrities; which done, it is ſold to the Potters for Six or Seven Pounds the Ton, who have occaſion for moſt that is found here for glaſing their Pots. There was a Lead Oar dug at *Ribden*; but none were ever conſiderable; and in the Biſhoprick of *Durham*, where there are great Quantities, it is obſerved that where there is much Coal, there is leſs Lead; altho' at *Mendip* Two or Three Hundred Weight of good Lead Oar is found growing to a Vein of Coal.

Lead, by reaſon of its great Plenty in *England*, as alſo its Cheapneſs, Fluidity, Ductility and Durableneſs, is put to abundance of Uſes, relating to Building, Waterworks, *&c.* And it is mightily improved of late by a new Invention of *Milling*, which renders the Sheet exactly equal in all its Parts, and more ſmooth and ſolid than Caſt Lead can be; whereby it becomes more beautiful and ſerviceable for all Purpoſes, (and eſpecially for covering Houſes, Churches, *&c.*) wherein Lead is uſed, than the other; it being to be had of any Thickneſs deſired, and the Sheets of Three Foot and a half broad, above twice as long as the Plummer can caſt, if required. Beſides, the thinner Sort of Three Pound to a Foot Square, with the Nails made of a mixt Metal agreeable thereto, is an excellent Sheathing for Ships; for it is a certain Security againſt the Worm, and much better for ſailing than Wood-ſheathing can be, and with reſpect to its Duration, *&c.* about *Cent per Cent* cheaper.

By melting, Lead may be *purged, viz.* by adding white melted Wax or Greaſe to make it flame; and then putting it into hot Water, it may be calcined or burnt, ſo as to be powdered by help of Fire or ſharp Liquors. The *Calcination* of Lead is by melting it in an earthen unglazed Pan, and ſtirring it over the Fire with a *Spatula*, till it is reduced to a Powder. If you increaſe the Fire, and ſtill calcine it for an Hour or two, it will be more open, and fit to be penetrated by Acids. If you calcine this Powder in a reverberatory Fire for three or four Hours, it will be of a red Colour, and is called *Minium*, or *Red Lead:* And if you take two Parts of Lead melted in a Pot or Crucible, and add to it one Part of Sulphur; when the Sulphur is burnt out, the Matter will be in a Black Powder, which is Burnt Lead. All theſe Preparations are drying; they unite with Oil or Fat in Boiling, and give them a ſolid Conſiſtence; therefore they are mixt with Ointments and Plaiſters.

In the Calcination of Lead, as well as ſeveral other Things, it is obſerved, that altho' the ſulphureous or volatile Parts of the Lead do fly away in the Calcination, which ſhould make it weigh leſs; nevertheleſs, after a long calcining, it is found that it increaſes in Weight. This is referred to the Diſpoſition of the Pores of Lead in ſuch a manner, that Part of the Fire inſinuating into them, does there remain embodied, and cannot get forth again; whence the Weight comes to be increaſed. I am informed that Lead that weighs in Air Thirty Pounds, weighs in Water but Twenty Seven Pounds; and that a Piece of unmelted Lead will ſwim in melted Lead.

A great many Bullets for Musket and Piſtol are made with Lead, by being caſt into Moulds; and alſo Shot, after another manner. Lead (beſides the Uſes commonly known) is alſo employed for refining Gold and Silver; and from it is made a Salt and many other Medicines, as may be ſeen in Diſpenſatories.

N. B. There is a ſort of Lead by ſome called *Glack*, much uſed by the Potters for *annealing* or leading their Pots, which is abundantly found in ſome Parts of *Wales:* which in the Deſcription is often miſtaken for that which is properly called *Black Lead*, of a quite different Nature from the other, and is wont to be uſed only for Pencils, and for Combs for Hair, &c.. This ſort is only found, by what I can learn, in *Cumberland*, and bears a very good Price for the Uſes aforeſaid: For tho' there has been found ſome in the *Weſt Indies*, much of the Nature of this; yet foraſmuch as upon Trial it would not bear the *Saw*, it has been rejected as of little Value. The *firſt* Sort of Black Lead, called *Glack*, found in *Wales*, is very different in its Nature from this, which is *infuſible*; whereas *that*, to anſwer its End, muſt be and is *fuſible* in the Potter's Fire.

But in the Bowels of the Earth are alſo contained rich and fruitful Mines of *Salt* and *Sulphur*, of which I ſhall treat next.

Of SALT, SULPHUR, &c. *in the Earth.*

DR. *Willis*, in his Enquiry into Chymical Principles, and of what mixed Bodies (*viz.* Animals, Minerals, and Vegetables) are made, and from what Parts Fermentation proceeds, affirms that all Bodies or Things when analized, and their Parts ſeparated by Fire, are to be reſolved or brought into *Spirit*, *Salt*, *Sulphur*, *Water* and *Earth*; and from the different Motion and Proportion of theſe Five Principles, the Beginning, Growth and Ending of Things, and chiefly the Reaſons and Varieties of Fermentation are to be ſought.

He tells us that *Spirits* are Subſtances highly ſubtle or fine, and always ſtriving to fly away from the Subject they are in, but are retained with more thick Parts; which thicker Parts they, being mix'd with, diſpoſe to Maturity; that is, they ſtill ſtriving to get away, raiſe the thicker Parts with them: By their Preſence they keep the mixed Body together, and open them by their Departure; and thus they bridle the Irregularities of *Sulphur* and *Salt*.

Sulphur is a Principle of a little thicker Conſiſtency than *Spirit*, and after that the moſt active; for when the Spirits fly away, the ſulphureous Particles endeavour to follow: The Temper as to Heat and Frame depends chiefly on Sulphur; and for the moſt part from hence ariſes the Variety of Colours, Smells and Taſtes; Beauty and Deformity. The Subſtance of Sulphur, tho' leſs ſubtle, is yet of more *Fierceneſs* than the Spirits; for unleſs it be reſtrained by ſome more groſs Parts, it deſtroys it ſelf with too much Violence: Indeed the little Parts of it being gently moved, cauſe Digeſtion and Ripeneſs, Sweetneſs and many perfect Qualities in Things. Being a little more moved, they cauſe Heat; and an Exceſs cauſes great Diſorders, and chiefly a ſtinking Savour; but a violent and extream Motion brings the Diſſolution of Bodies with a Flame and Burning.

Salt is of a little more fixed Nature than either *Spirit* or *Sulphur*, not ſo apt to fly away; but beſtows a Cloſeneſs and Solidity on Things, as well as Weight and Diuturnity. It retards or ſlackens the Diſſolution or Separation of Bodies or Things, and promotes Coagulations and Sticking together, and very much reſiſts Putrefaction, Corruption and Inflammations, becauſe it fixes the *Sulphur* and *Spirit* that are apt to fly away; wherefore heavy Woods, Stones, Metals, and what abounds in Salt, will hardly burn, and remain a long while free from Corruption.

The Fruitfulneſs of the Earth, and the Growth of Plants, take their Original from the Operations of Salt. *Salt*, when almoſt void of Spirit and Water, but bound together with Earth or Sulphur, grows into Stones, Metals or Minerals, which is imitated in making Glaſs or Earthen Wares; but when it is looſed from its Fixedneſs with the Earth, and mingled with Spirit and Sulphur, and diluted with Water, it ferments; and being ſo put into Motion, there is obſerved a threefold Condition, *viz. Fuſion*, or Melting; *Volatilization*, or Readineſs to fly away; and *Fluxation*, or Running about.

From Fuſion, proceeds a rude and indigeſted Formation of Things, an ingrateful or unpleaſant Smell, and for the moſt part Bitter or Biting: From Volatilization of Salt, proceeds Beauty, Fairneſs and pleaſant Smell, as in florid Blood of living Creatures, in ripe Fruit, Sugar, Milk and Honey: From Fluxation of Salt, proceeds the ingrateful Sourneſs of Wine, Milk, Blood, and eatable Things, that at firſt were grateful and ſweet. And from the aforeſaid Three Principles, Spirit, Sulphur and Salt, (which are called *Active*) we come to the other Two call'd *Paſſive* Principles.

The firſt is *Water*, which carries the Spirit and Sulphur about, and by whoſe help they mix together, and alſo with Salt; and were it not for the Water to keep them in Motion, they would grow ſtiff as if frozen. When *Water* is wanting, Things wither; when it abounds, they are ſluggiſh and ſlow. Bodies too moiſt, are liable to Rottenneſs and Corruption, and then the Water eaſily flies away, and carries with it the Spirit and Sulphur, and leaves the Body dead, or made ſharp with Salt, which we call ſour. From hence it is that Infuſions of Vegetables, (ſuch as Beer) Decoctions, Juices of Herbs, and all wateriſh Preparations, if they have too much of the Water, they eaſily corrupt.

The laſt Principle is *Earth*, which, with the Water, helps to extend and fill up Things. The more Earth there is in any Body, that Body is leſs active, and laſts longer: Hence Minerals endure long; next the greater Trees; when Animals and more ſlender Plants are but ſhort liv'd. But I am now to ſhew you how theſe Principles agree and diſagree.

The Spirit and Sulphur agree very well, and eaſily mix and fly away together; but Spirit and Salt are not ſo eaſily join'd: For Sugar and Salts are ſcarcely diſſolv'd in rectify'd Spirit of Wine; (Spirit diſtill'd ſo high till it will all burn away; or if Cotton or Gun-powder be put in, it will burn till it dries, and makes them take fire.) To which I'll add, that when Brandy is burnt with Sugar, the Sugar will not diſſolve till the Spirit is almoſt burnt away. But Spirit and Salt, by the Mediation of Sulphur, will eaſily mix together; and as Spirit beſt agrees with Sulphur and Water, ſo Sulphur intimately cleaves to Earth and Salt. But as Spirit does not join with Salt, ſo Sulphur does not with Water; for fat and oily Things, as alſo Gums and ſulphureous Roſins, either ſwim upon the Water or ſink down to the Bottom: But ſulphureous Things (Salt coming between) are mixed with a watery Liquor, as we ſee Oils mixt with Sugar or Salt will diſſolve in Water, which otherwiſe would flow ſeparate.

Salt, beſides its Affinity with Sulphur, is alſo moſt ſtrictly united with Earth; wherefore Stones, and the more hard Minerals, conſiſt chiefly of Salt and Earth. In Glaſs, Salt and Earth are ſo ſtrictly join'd, that by no means can they be ſeparated; but Salt is moſt eaſily diſſolved in Water; it melts of its own accord in a moiſt Air, and theſe are as eaſily ſeparated one from another.

From the various Combinations the Principles have various Names; for Sulphur, when joined with Spirit, is called *pure and ſweet*; with Salt, *impure and ſtinking*; when with Salt and Earth, it is call'd *thick* and *earthy*; when the Spirit takes ſulphureous Particles, it is *ſweet*; when ſaltiſh Particles, *ſharp*; when both, *bitter*. And Salt is known by divers Names; for beſide the Names of Fluid, Fixed, Volatile, it is termed Marine, Aluminous, Nitrous, Vitriolick, Aromatick, or of ſome other kind.

Dr. *Wilkins* reckons Sulphur among ſuch earthy Concretions as commonly grow in Mines, and are diſſolvable by Fire, inflammable, of a dry Conſiſtence and yellowiſh Colour. And Dr. *Grew* gives an Account of a great many Sulphurs in the Repoſitory at *Greſham College*, particularly of Native Sulphur, chryſtalized, of a pale golden Colour ſent from *Peru*, and the like from the Pike of *Tenariffe*. There is alſo a Lump of Native Sulphur like *Olibanum* Drops, or opacous yellow Amber, from the ſame Place. Two Pieces of Oar; the one Earth of a brown, the other Stone of a Sand Colour and gritty. Native Sulphur of *Iceland*, of the Colour of common factitious Brimſtone, and immerſed in a ſtony Bed. Some of a curious Orange Colour, extracted from Gold Oar. Sulphur Oar of *Freyburg*. One Piece almoſt like Cinabar, which in Fire ſmells like Brimſtone, but flames not. Two of blackiſh and Aſh-coloured Parts mixed with Red; in the Fire they are like the firſt, inflammable, but ſmell not ſo ſtrong. A Green Sulphur Oar. Oar of *Iceland*, opacous, and immerſed in a bluiſh Glebe.

Dr. *Plot*, in his *Hiſtory of Staffordſhire*, ſays, that the Coal of *Wednesbury* has much Sulphur; from whence might be made Rolls, Flower of Brimſtone, or Oil of Sulphur *per Campanam*; and believes, that and the Pyrites to be the Cauſe of Earthquakes: He alſo gives Accounts of divers ſulphureous Waters, with many Cures they have done; but their being Sulphur, *appears* not, but is found out by divers Experiments and Concluſions from them.

From Sulphur or Brimſtone are made abundance of Medicines, of which there are Accounts in the Diſpenſatories.

Nitre, or Salt Petre, Dr. *Wilkins* reckons a factitious Subſtance, having ſome Analogy to ſuch earthy Concretions as grow in Mines, diſſolvable by Fire or Water, and not inflammable, of the more ſimple ſort, being a kind of Salt of the Air, uſed as a chief Ingredient in the making of Gun-powder.

Dr. *Willis* ſays, that Nitre or Salt Petre is not to be enkindled by it ſelf, tho' a ſtrong Fire will melt it; but being mixed with ſulphureous Things, it flames with Force and Exploſion; for being added to common Sulphur, Antimony or Tartar, it burns with a thundering Noiſe: Alſo if you put into it melted a burning Coal, the Flame is caſt forth round about with a Wind; ſo that the Matter put in is flung up and down, and often quite out of the Veſſel: By this means the Nitre is conſumed, and the fixed Salt (which is Tartar) remains.

From hence Nitre ſeems to conſiſt of abundance of Salt and a little Sulphur, both ready for Motion; tho' the Salt is too ſtrong for the Sulphur; but when that is help'd by another enkindled ſulphureous Body, the Particles of Salt are disjoined, and the little Bodies of Sulphur fly forth with Violence. To prove it is Sulphur, is urged its burning Quality in Agriculture, flaming Colour, and Generation among ſulphureous Excrements of Animals.

Mr. *Henſhaw*, F. R. S. thinks the Air to be full of Nitre; and tho' it may be extracted from Earth, the ſulphureous ſaline Particles are imbibed from the Air, by Cavities in alkalous or other acid Bodies, as I have ſhewn in my Account of fertilizing Earth, and impregnating Lime, *&c.*

Of Salt *made, and* Salt-Works.

Dr. *Wilkins* reckons *Salt* to be a factitious Subſtance, having ſome Analogy to the Mineral, and diſſolvable by Water, not inflammable, being a more ſimple kind from Sea-Water, and the moſt neceſſary Condiment for Meat.

Moſt Authors make a difference between *common Salt* made from Brine, or the Salt from the Sea, and *Rock Salt*; but Dr. *Halley* thinks them all one, and he proves it thus: He made a Brine with common Salt, and fully ſatiated it ſo that a good Quantity ſunk to the Bottom in Form of white Salt; then he hung in this Brine for many Hours a Piece of Rock Salt, but there would not one Grain of it diſſolve; but when other ſorts of Salt were put to it they diſſolved preſently: From whence he concludes, that the Rock Salt and common Salt were of the ſame Species of Matter.

Dr. *Grew*, in his Anatomy of Plants, *&c.* thinks Sea-Salt nothing elſe but that of Animals and Vegetables carried thither and freed from their other Parts, which he endeavours to prove by an Experiment; but conſidering Dr. *Halley*'s Experiment above, and that the major Part of Sea-Salt is Acid, and the major Part of Animal and Vegetable Salts are Alkalous, I ſee no reaſon why we may not think the Saltneſs of the Sea to proceed alſo in a great Meaſure from the waſhing down of the Foſſile or Rock-Salts, either from thence, or after they have been brought into Uſe by Mankind; and of the ſame Opinion is Dr. *Plot*, who is confirmed by the Authority of *Pliny* and others.

But to proceed to the making of Salt; Dr. *Plot*, in his *Hiſtory of Staffordſhire*, tells us of ſome in the Pariſh of *Weſton*, where is made perhaps as good white Salt as any in *England*, tho' not to ſo great an Advantage; for it yields but a Ninth part of Salt, whereas at *Up-wick* and *Middle-wich* it yields a Fourth, and at *North-wich* and *Nampt-wich* a Sixth; but with the Advantage of the Brine left in a former Pan, Fifteen Hogſheads of Brine makes Nine Strike of Salt, which is Sixteen Hours in evaporating away.

The Pit from whence this Brine is pumped is Nine Yards deep and Two Yards ſquare; what comes from the Bottom is much the ſtronger in Saltneſs and Stink, and of a clearer Complection: And the Pans wherein they boil it are Three, made of Forged Iron two Yards three Quarters long, and one Yard three Quarters broad; and their Fuel Pit-Coal, whereof, when their Pans are all kept going, they ſpend two Tons to a Drawing. During the Boiling, the Salt is cleared from Sand, of which there is ſome (at leaſt *will be* after it has exhaled for ſome time) in all Brines whatever, which is thrown off towards the Corners of it, where are placed ſmall ſquare Iron Pans to receive it; this Brine, which is evaporating ſo long, yielding ordinarily from the Five Fillings Ten Pans of Sand, each weighing Ten Pounds, in all One Hundred Pound of Sand, which is above one Fourth of as much Sand as Salt, allowing a Buſhel of Salt to weigh about Fifty Pounds. About three Hours before the Evaporation is finiſhed, that is, before they begin to draw (at the Fifth Filling) they clarify the Brine with the White of an Egg; which being broken into a Bucket, and mix'd both with cold and ſome of the hot Brine, is by the

Motion of the Hand brought into a Lather, and gently ſprinkled all over the Pan; whereupon there preſently appears a Scum, that thickens by degrees as the Impurities riſe, which thus catched and detained by the Viſcoſity of the White of the Egg before the Brine boils again, is drawn over the ſide of the Pan with a thin oblong ſquare Board, fixed to a Staff or Handle call'd a Loot.

The Scum taken off, they boil it again gently till it begins to corn; which to have to Deſire, if they intend a large Corn, and have but little Time to let it corn by a gentle Fire of itſelf, they put into it about a Quart of the ſtrongeſt and ſtaleſt Ale they can get; which corns it greater or ſmaller, according to the Degree of Staleneſs: Or if they would have it finer than it uſually corns of itſelf, they either draw it with a quick Fire, which breaks the Corns ſmall, or ſprinkle the Surface of the Brine with fine Wheat-Flower, which makes the Salt almoſt as fine as the Sand which comes from it; which being very fine and white, it is thought may be of admirable Uſe in making of Glaſs. But during the Time of its corning, they generally ſlacken their Fire, ſupplying the Furnace now rather with the Cinder of the Coal, (the ſmaller ſort ſifted from the Aſhes,) than the Coal itſelf; this giving the Brine a gentle Heat without Flame, and corning it better than a forcible Fire, which breaks it ſmall. Quickly after it has ſpent ſome Time in corning, they begin to draw, *viz.* to take the corned Salt from the reſt of the Brine, with their Loot, which they put into Wicker-Baskets called Barrows, made in a conical Form, and ſet the Bottom upwards, each containing a Buſhel; through theſe, being ſet in the Leach-Troughs, the Salt drains itſelf dry in three Hours, which Draining they call their Leach-Brine, and carefully preſerve it to be boiled again, it being ſtronger Brine than any in the Pit.

The Draught of the corned Salt continues for about Six Hours, and is performed gradually, the Salt-workers getting firſt about Two Buſhels, or Barrows-full; then by a gentle Fire they corn it again in half an Hour for the three firſt Pair of Barrows, but afterwards not under an Hour, the Brine being then thinner and the Pan cooler. They leave ſome Brine towards the next Filling; which, with the Addition of the Leach-Brine, heightens the weak Liquor, and much advances the following Operations. The Barrows being fully drained, are removed into the Hot-Houſe, behind the Saltern, to dry, and are ſet over the Brick Conveyance for the Flame, from under the Pans to the Funnel of the Chimney, (which Paſſage for that Purpoſe is made Six or Seven Yards long;) where after they have continued for Twenty-four Hours, the Salt will become ſo dry, that it is fit for Carriage or Publick Sale.

This is the Proceſs of making Salt in *Staffordſhire*; which, tho' much more chargeable than in *Worceſterſhire* or *Cheſhire*, where they ſpend not ordinarily above half the Time or Fire, of what the great Quantity of Brine they muſt uſe here neceſſarily requires for its Evaporation; yet its being always clarified with Eggs, and not with Bullock's Blood, as it is moſt commonly in *Cheſhire*, (which gives the Salt an ill Colour and Savour, and its being better cleared from Sand by long Boiling than either *Cheſhire* or *Worceſterſhire* Salts,) have given it the greateſt Reputation

Mr. *John Collins*, F. R. S. in his Book of *Salt* and *Fiſhery*, written *Anno* 1682, ſays, that the chief Brine-Pits for Salt are in *Cheſhire* and *Wor-*

Worceſterſhire, and that the chief in *Cheſhire* are at *North-wich*, *Middle-wich*, *Nampt-wich*, of which *North-wich* excels.

There is in the Town one Pit, and five without, and all afford great Plenty of excellent Brine; of which is made Salt, pure, ſmall, or big kerned, heavy, hard and dry, that loſeth little in Bulk, if well kilned or preſſed into the Bag, which are the Qualities of the beſt Salt, and is there ſold at Six-pence the Buſhel. The Town-Pit is more conveniently ſituated than the reſt, being within Five or Six Miles of *Fratſome* Bridge, where it is laden for *Ireland*, and a River comes through the Town that might be made navigable. At *Middle-wich* are Seven Pits or Brine Sheaths, which yield great Plenty of moſt rich Brine. At *Nampt-wich* is one within the Town and two without, and are ſufficient to ſerve the fourth Part of the Nation, altho' it is weaker than the other *Wiches*, in which ſome will turn to Salt in an Hour's Boiling; whereas at *Nampt-wich* the Pans are twice or thrice filled, and boiled down. Leaden Coolers have been made to put the Salt in, as it came out of the Pans, where it would dry, harden, and become big-grained.

It is Mr. *Collins*'s Opinion, that in *Cheſhire* and *Worceſterſhire*, with Skill, Coſt and Labour, there may be more Salt made than can be ſpent in the King's Dominions. He ſays, that at *Nampt-wich* they boil it in Iron Pans, about Three Foot Square and Six Inches deep; their Fires are made of *Staffordſhire* Pit-Coals, and one of their ſmall Pans is boiled in Two Hours. To clarify and raiſe the Scum, they uſe Calf's, Cow's and Sheep's Blood; but this gives the Salt an ill Savour, as I preſume any Blood will do: And it is by its Viſcoſity, like Whites of Eggs, which makes the Filth ſtick to it, and get together in a Scum; and the Blood is uſed only for Cheapneſs-ſake.

About *Droyt-wich*, within four Miles of *Worceſter*, are many Salt-Springs; and from one in the great Pit at *Up-wich*, is made Four Hundrd and Fifty Buſhels of Salt in every Twenty Four Hours; it is ſo ſtrong, that the Fourth Part is Salt. They uſe Leaden Pans Five Foot and a half long, and Three Foot wide. Their Fuel was formerly all Wood; but ſince the Iron Works in the Foreſt of *Dean* have deſtroyed that, they now uſe Pit-Coals.

The Salt-Springs are very cool at the Bottom, and not to be endured by Men above half an Hour, tho' they be well warmed with much ſtrong Liquor; however, it never freezeth. To prove this Salt better than others, Mr. *Collins* ſays, it will dry in Four Hours, and keep ſo Three Quarters of a Year; that none is whiter and freer from Droſs; and a *Wincheſter* Buſhel weighs half an Hundred; that in the ſame Quantity it makes Meat ſalter than *French* Salt: But I conclude this muſt be from its being freer from Droſs, and ſo there is more Salt; and its having a ſmaller Grain, which makes it diſſolve ſooner. Herrings have been ſalted herewith, and have been whiter and better taſted than with Bay Salt. It is ordinary to ſalt Beef but once to keep a Year; and it is common with all barrel'd Beef to do ſo.

They have a ſort called Clod-Salt, digged from the Bottom of the Pans with a Picker, being the ſtrongeſt, and moſt uſed for Bacon and Neats-Tongues; it makes the Bacon redder than other Salt, and the Fat eat firm. Some ſay this Salt is beſt for Cheeſe, but it is accounted too ſtrong for Beef; perhaps becauſe it is a large Grain, and penetrates by degrees, which is equivalent to an often Salting. With the fineſt white Salt they make Loaves like Sugar-Loaves, which will keep dry without Fire; but it is otherwiſe at *Nampt-wich*, I preſume from a different Management.

As to Salt made by boiling of Sea-Water, the want of Brine-Springs near the *Eaſtern* Coaſt, and the Dearneſs of Foreign Salt, neceſſitated the making of Salt at *Shields*, and *Biſhop Weremouth* in the Biſhoprick of *Durham*. The Pans here uſed are made of wrought Iron, of Eighteen or Nineteen Foot long, Twelve Foot broad, and Fourteen Inches deep, and boiled with Sea-Coals. At Spring-Tide they let the Sea-Water into Ponds, from whence it is pumpt into their Pans, which are Six or Seven Times filled, and half or more every Time boiled away, before it becomes ſalt.

When great Freſhes come into the Rivers *Tine* and *Were*, they take no Liquor; neither need they, for they make as much Salt in *Six* Months as they can ſell in *Twelve*. Of late they boil their Salt better, and make it harder than formerly; for this Salt hath had a bad Repute, by being moiſt and apt to run to Water. The Sum is, that with good Care it will ſerve for moſt Purpoſes, and is found peculiarly good for Hung-Beef and Bacon.

Salt made from Brine rais'd by the Sun, *&c.* is made at *Limmington* in *Hampſhire*, not far from *Portſmouth*, in an Iſland called *Portſea*, from whence the Salt hath its Denomination. The Place where this Salt is made, is called a *Salt-Work*; and in it is to be conſidered, Firſt, the Quality and Situation of the Ground; Secondly, the Banking or Recovering the ſame; Thirdly, the making of Brine-Pans, and in them Brine by the Sun's Exhalation, with the Manner of doing thereof; Fourthly, the Boiling-Houſes, Grates, Iron-Pans, and the Art of boiling Brine into Salt.

For the Quality and Situation of the Ground, it ought to be a Sea-Mud, Oaſe or Sleech, overflowed (if it may be) at the loweſt Spring-Tide Three Foot; and then the higheſt will be ſometimes Twelve or Thirteen Foot. The Reaſon of ſuch Overflowing is, that there may be made Feeding-Ponds with Walls of Earth, to keep Sea-Water in of any Dimenſions, Two Foot in Height one above another, ſo that the loweſt may be filled by a little Sluice in the Bank, at the loweſt Spring-Tide, where this (which is called Stay-Liquor) will improve by the Sun and Wind before it be tranſmitted into the ſhallow Brine-Pits, on lower Ground. Theſe Ponds are furniſhed with Mullets, Plaiſe, Flounders, Eels, and other Fiſh from the Sea; where they increaſe incredibly, and exceed both in Goodneſs and Largeneſs freſh River Fiſh of the ſame Kind. If convenient, there may be alſo Oyſter-Pits.

The Ground muſt be ſtrong Sea-Mud, like Clay, that will retain Liquor. This Mud ought to be Eight or more Feet deep, for making of Ponds, called Ciſterns, to keep Brine in, without ſoaking away, after it comes from thoſe Pans called Sun-Pans, where it is made ſtrong, and transferred into theſe, to grow more mature with Age. Here the Brine may may be impaired with Rain-Water, but that will ſwim uppermoſt, and the Brine may be pumped from the Bottom, if the Bottom of the Pump be faſtened into a Basket.

If one of theſe be covered with a Tiled-Roof, it is called a Brine-Houſe, to retain Store for Winter-Boiling; and Tiles are better than Thatch, becauſe its Straws will fall into and diſcolour the Liquor. The Sides and Ends of the Brine-Houſe ought to be Poſts of Timber, with Hurdles behind, the Ground being ſuch as will not imbibe the Liquor.

If the Ground do not admit the Depth above-mentioned, Ciſterns are to be made above-ground, into which the Brine muſt be pumped or laved; which the Workmen, in wet Weather, are apt to decline, to the Loſs of much Brine. But in the uncovered Ciſterns the Brine will freeze, and therefore ought to be removed. In the Tiled Brine-Houſe it freezes not.

The beſt Situation for a Salt-Work, is where there is moſt Sun-ſhine, and the Wind has freeſt Acceſs, near a Coal-Mine or good Turf; however, not far from ſuch Place where Coals may be landed, and Salt exported. If Ground might be had to Wiſh, it ſhould be a Riſing Ground, with a Channel in the Middle: Then with Banks three Parts round, high and ſtrong enough to keep out the higheſt Tides; both from the Sea and Channel may Ponds be made with low Banks; and tho' the Water, by Sluices, be let in from the Channel, and out from the higheſt to the loweſt at Pleaſure, and be the eaſieſt Charge. If it be in a Salt-Water River, land-lock'd, it will be much the better; for leſſer Banks will ſerve, and they will endure better. Near the Channel, in the Middle, may be made a Key, whereon to land or ſhip Goods; athwart which ſhould be a Sluice with ſtrong Gates, whoſe Hinges open Sea-wards, to carry off Freſhes, and to keep Sea-Water out: and other Gates may be made towards the Land, to draw up with Windleſſes.

Banking and recovering the Ground is performed by the Aid of Gin-Boats, to drive into the Mud Rows of Trees, and Poſts ſharpened at the lower End to ſhape out a Walk. Theſe Trees to be bound together long and broad-ways, like the Ribs of a Ship, with Flitterns, or Pieces of Oak, or Croſs-Bars; and after good Store of Stones have been thrown into the Middle, and Parts adjacent to the Channel, where theſe Trees ought to be thickeſt and longeſt, the ſame to be boarded up, and the Whole filled when it ſhall be fitting with Stones, Gravel, Clay, *&c.* which will force the Mud out on each Side, and make a Declivity; which Sea-ward may be hardened with Gravel to become a narrow Walk, wherein to ſtand to drive Stakes, whereto to fix Hurdles or Hedges, which will be filled with Sea-Weeds, and much defend the Bank from being waſhed down by the Waves.

After a Summer or two the recovered Mud will be dry, with Cracks which muſt be filled with Earth, and reduced to Feeding-Ponds, and Levels for Brine-Pans. This Mud will make excellent Bricks, and Soil for Lands; but what is deſigned for Tillage and Paſture muſt be deep-ploughed and harrowed, that Rain-Water may not waſh the Salt out; or it may be cured with Lime or Marle, which makes it admirably fertile, and a very good Compoſt to improve barren Ground.

Mr. *Collins* gives the Manner of making Brine-Pans and Brine; alſo of Salterns or Boiling-Houſes, Grates, Furnaces, and Iron Boiling-Pans, *&c.* of all which I have ſaid ſomething in my *Cheſhire Salts*; and if more be deſired, I refer you to his Book, or the Places about *Portſmouth*, &c. where all may be ſeen.

Salt upon Salt is Sun-made Salt, boiled up with Salt-Water, and cleared from Dirt, Sand and Bittern; and this is allowed to be good for all Intents and Purpoſes. Salt upon Sand is is only Salt-Water-Sand waſhed and boiled to Salt, made by them that know not how to do better. The Chymiſts ſay, Rain and Dew will yield a Salt, and have given the Proceſſes of making it; and it is reaſonable enough that their coming through the Air ſhould bring ſome of the Nitre with them.

Mr. *Collins* mentions divers Inſtances of Fertilizing Land by Salt, tho' anciently ſome Cities were curſed by ſowing of Salt; and undoubtedly, diſcreetly uſed, it is excellent Manure; *i.e.* in too great Quantity it *kills*, in leſſer *fertilizes*.

Dr. *Wood* tells us, that ſeveral Plants as well as Fiſh thrive well in Salt-Water; but where he ſpeaks that Dung fertilizes, *ergo* Salt, he miſunderſtands his Subject; for the Salt of Dungs is a quite different Sort of Salt from *Foſſile* or *Marine*. He gives ſeveral Inſtructions about the moderate Uſe of Salt in fertilizing Land, which is certainly right; but ſtill ſpeaks of my Lord *Bacon*'s applying Fertility to Salt, as if he meant *Marine* Salt.

Not but that it is very reaſonable to ſuppoſe from Experiments that have been made, that even *Foſſile* or *Marine* Salts have much of the Nature of *Nitre* in them; that is to ſay, they in ſome degree cauſe a *Ferment*, which is a Help to Vegetation: They ſet in Motion the earthy Particles, or proper terreſtrial Matter, which by the Help of Heat and Moiſture are conveyed thro' the Veſſels of Plants for their Nouriſhment and Increaſe. This may be gathered from the Effects of Sea-Sand (and the ſalter and wetter it is the better) laid upon Land as a Manure: The Sand diſperſing *equally* the ſaline Particles, (and not ſuffering them to lie in Heaps, which would prove fatal) ſurpriſing Products even from worn-out Land have been obſerved to follow; for which Reaſon it is that I have warmly recommended this Practice to thoſe who live within a few Miles of the Sea.

Brining of *Wheat* (now grown very common) is found good by Experience to prevent Smut, Vermine, &c.

Of QUARRIES, &c.

IN many Parts of *England* there are Plenty of Quarries of Stone, &c. for Materials for Building, and Fences for Walls, dug in the Earth, as well as Mines of Coal, Oars, &c. And the chief of theſe Quarries, for the Product of beautiful Stone, is in the Iſle of *Portland*; tho' there are few Lords of Manors, eſpecially where there is a Scarcity of Timber and Wood, but on their Lands may dig Stones fit for any common Employment; ſo well is Nature ſtored with what is neceſſary for the Conveniencies of Life, in this our Iſland.

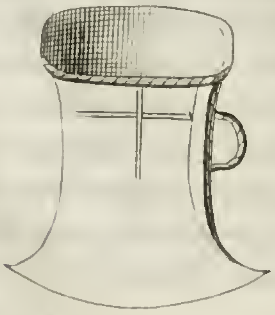
Near *Chatſworth*, in *Derbyſhire*, the Seat of his Grace the Duke of *Devonſhire*, there is a Piece of Ground call'd *Haddon Paſture*, ſo rich for its ſubterraneous Products, that as many Shillings have been offered for it, as lying flat would make a Border round it; which was refuſed, unleſs they would ſet them *edgeways*; and ſome think that would have been a good Bargain. The Paſture of this Ground is extremely rich; and beſides a rich Oar within leſs than a Yard of the Surface, and ſtore of Iron Oar, here are extraordinary Quarries of Mill-ſtones that ſerve moſt Part of the Kingdom, and they are worth Eight, Nine or Ten Pound the Pair; and Grind-ſtones of all ſorts, from Five or Six Foot Diameter and under, and Scythe-ſtones in abundance. There are alſo Quarries of Free-ſtone, Alabaſter and Marble; of which as curious Works may be made as the World affords.

There is alſo ſtore of Lime, which makes as good Mortar as can be uſed; and Critch-Lime is carried up and down for Whiting, being as pure as any Chalk: There is likewiſe great ſtore of Plaiſter, which being burnt and thraſhed to Powder, (to which it burns with eaſe being new) and this being well wrought with Water, and ſpread on a Floor, in a few Days will be as hard as Brick, and may be made as ſmooth as Glaſs; but the Floors are commonly made part of old and part of new Plaiſter, and the new alone is uſed for drawing a thin fine white Coat over the grey, (*viz.* old and new beaten together) and if this prove to be curiouſly burnt, neither too much nor too little, it will continue a firm Floor for Hundreds of Years, tho' conſtantly trod upon, and will be ſafe from all Danger of Fire; but if it be *too much* burnt, then it will be more ſoft when the Floor is caſt, and will ſweep up in a ſhort time, unleſs extreamly water'd, which ſometimes recovers it; and if it be *too little* burnt, then it cannot be thraſhed to any purpoſe, ſo that the Floor will have Lumps, as if it was full of Stones, which will be the ruin of it; ſo that you are under a Neceſſity of avoiding theſe two Extremes in the Uſe of this Flooring.

This Account I have mention'd, to ſhew the Treaſure of the Earth; and there are many Places in this Kingdom, that are extremely rich in their Products of Mines, Quarries, *&c.* as well as *Haddon Paſture* above deſcribed.

For as I have Reaſon and Occaſion often to obſerve the wonderful Proviſions of Nature and Riches couched in the Bowels of the Earth throughout the Biſhoprick of *Durham*; ſo here it cannot but be obſerved with Gratitude, that hardly any one valuable Treaſure ordinarily found ſcattered in ſome other Parts of the Kingdom, but it is found in ſome meaſure here, and in moſt ſorts a vaſt Plenty; and that (which is no inconſiderable Circumſtance) generally within a ſmall Diſtance of a navigable River. The inexhauſtible Mines of the beſt *Coal* in *Europe* (of which more preſently) is an immenſe Treaſure, as they bring Riches, not only from our own Ports, but from all the neighbouring Kingdoms. *Free-ſtone* of all ſorts; ſome as fine as that from *Portland*, fit for the beſt Floors, Walls and Chimney-Pieces, is found in great Plenty even on the Banks of navigable Rivers; not to mention the beſt ſort of Fire-ſtone, Grind-ſtones, Mill-ſtones, but eſpecially Lime-ſtone; of which more in another Place. At *Penchy-Hill*, Three Miles from *Sunderland*, there are Three remarkable Treaſures couched in its Bowels: On one ſide is found *Coal* at an eaſy Depth; on another ſide is found excellent *Lime-ſtone*, and on a third ſide great Quantities of *Free-ſtone* for Building, all within One Hundred Yards compaſs. Thus are ſeen together Stone and Mortar, growing as it were out of the Bowels of one little Hill.

To ſay nothing here of Lead, Iron, *&c.* which hath been ſpoke of ſeparately, I cannot forbear mentioning one remarkable Thing lately found in the Bowels of the Earth, even in my own Glebe at *Biſhops Weremouth*, where the Quarry-men digging for Lime-ſtone, at at leaſt Ten or Twelve Foot Depth of ſolid Rock, found, to their great Surprize, amidſt the ſmall Joints and Crevices of the Stone, three Pieces of Caſt Metal hard almoſt as Steel, and yet reſembling *Bell-Metal*, in the Form here annex'd; *Two* of them much bigger than the *Third*, hollow within, and perfectly ſharp in the Edge. It is hard to ſay how or when they



P.192

they ſhould come there, as of what Uſe they could be; except, having Sockets, they ſhould be uſed as offenſive or defenſive Inſtruments in War.

According to the aforegoing Conjecture, having ſhewed the Curioſity to ſome converſant in Medals, and other curious Pieces of Antiquity, I find it is generally agreed to be a ſort of *Cuneus*, or Battle-Ax, which the *Danes* brought over amongſt us in great Quantities; which, it is probable they put on the End of their Spears *occaſionally*, as rather defenſive Weapons to keep off the Horſe from annoying and diſordering the Foot Soldiers. Whether this Conjecture be right or no, I know not; but I have been told by an ingenious Gentleman in the Herald's Office, that there are ſeveral of them found in many other Parts of the Kingdom, in much the ſame manner as before related, even in the Caverns of the Earth, and very deep amongſt the Clefts of the Rocks, moſt frequently lying on Heaps in Numbers, ſometimes Twenty or Thirty of them together.

It is here to be obſerved, that hard Rocks have not a *cleaving* Grain as ſoft ones have; and therefore when they are minded to break up the Stone in ſuch Quarries, they uſe great heavy Stone Axes, with which they work down a deep Channel in the Stone; into which Channel, at the Top they lay two Iron Bars, ſuch as Smiths have from the Forge to work out, and ſo they drive Iron Wedges between theſe Bars to break off the Stone; for their Wedges will not go where there is not a Channel made for them, as they will in ſoft Stones.

But then again, that which in ſome Quarries cannot be effected without much Time and Toil, as well as an extravagant Expence, by the Help of divers Tools and Inſtruments, ſuch as Mauls, Pick-Axes, Wedges, Leavers, &c. is in other Places readily performed with leſs Charge and Trouble, by making a ſmall Perforation into the Rock, which may reach a pretty way into the Body of it, and have ſuch a Thickneſs of the Rock over it as is thought convenient to be blown up at one Time. For at the further End of this Perforation a convenient Quantity of the beſt Gun-powder is placed; and then all the reſt of the Cavity being filled with Stones and Rubbiſh ſtrongly rammed in, (except a little Space left for a Train) the Powder by the help of it is fired; and the impetuous Force being hindered from expanding it ſelf downward, diſplays its Strength againſt the upper Parts of the Rock, which cracks it into ſeveral Pieces, moſt of which, with no great Difficulty, ſubmit to the Strokes of the Workmens Hammers; and thus, by the help of a few Barrels of Powder employed in this manner, many Thouſand Tons of Stone have been obtained out of a common Rock.

But notwithſtanding all this, it ſhould not be diſſembled, that this Matter of blowing up Rocks, of *Lime-Stone* eſpecially, is by no means brought to that Perfection one might have expected from the Force of Powder; at leaſt to have it done in ſuch a manner and meaſure as to anſwer the Charge: Of which I have an experimental Knowledge in my own Glebe: where I have vaſt mountainous Rocks of Lime-Stone, lying with little Earth upon them, and bedded in large Pieces with few Seams, in perpendicular *Strata* about Fifty Foot deep. On theſe have been ſeveral Attempts made by Gun-powder, the Rock being firſt bored *perpendicularly*, and the Powder ramm'd and faſtened in by proper Plugs; but yet the Fraction always proved too inconſiderable for the Trouble and Charge; which has diſcouraged further Attempts that way: However, it ſeems rational to hope, that if a Contrivance could be made at the Bottom of the Rock, where it is excavated, to bore an Hole *horizontally* into the moſt ſolid Part, and to make a Cavity within much bigger than the Orifice to receive a Quantity of Powder, the Earthquake and Diſſolution, as well as the Advantage accruing thereby, might be very conſiderable. This is what I purpoſe, ſome time or other, to try and improve, if poſſible; and in the mean time, for my own Sake, as well as the Good of the Publick, ſhall be glad if any ingenious Perſon skilled in the Force of mechanical Powers, would communicate to the Publick his Thoughts on this Head. I have been lately aſſured, that they conſtantly and ſolely uſe this Method of Gun-powder in the *Weſt* of *England*, tho' I have not been able yet to obtain an Account of their Art.

Of COALS *and* COWKE.

OF *Coal* we have abundance in *England*, more perhaps than in any other Part of the World, dug out of Land, to the very great Profit of the Owners of the Soil. *Coal* is thought to be nothing elſe but Bitumen indurated by Time and ſubterraneous Heats.

There is a ſort of *Cannel Coal*, of ſo cloſe a Texture, that it will take a tolerable Poliſh; and the Choir of the Cathedral Church of *Lichfield* is in a great part paved Black and White, with *Cannel Coal* for the Black, and *Alabaſter* for the White; and when kept clean, it appears like Black and White Marble. It turns like Ivory into many pretty Utenſils, *Ink-Boxes*, *Candle-Sticks*, &c. This Coal is dug in the Park adjoining to *Beaudeſert*, belonging to the Lord *Paget*, about Thirty or Forty Fathom deep, lying between other Beds of a ſofter Kind, and is the beſt in *Staffordſhire*, or any where elſe; except in *Lancaſhire*, which it is ſaid has no Grain, and therefore not cleaving as this will do; upon which Account it is preferred for making ſuch Utenſils as above.

The chief Uſe of the *Staffordſhire* Coal is for Firing, wherein thoſe who uſe it obſerve the Grain of the Coal; for if they would have it burn *ſlow*, they lay it flat-ways upon the Fire; but if *clear*, it is ſet edge-ways, and then it burns as light as a Candle. The Coal dug at *Hanley-Green* near *Newcaſtle under-Line*, is much ſofter, and of much more ſenſible Plates, which appear to the naked Eye when the Grain of the *Cannel* will not: Wherefore this is no more capable of Politure than common Coal, yet it is more gay to the Sight, and it burns ſwift; and therefore better for Smiths than Kitchen-Fires, tho' not ſo good as Sea-Coal.

Theſe laſt are beſt ſupplied by the common Coal of the Country, eſpecially that of *Dudley*, *Sedgley*, &c. which ſome prefer to the *Cannel* itſelf; the Texture and other Qualities thereof being ſuch, that it is a fat ſhining Coal, having a pretty open Grain, lying ſeldom in a Level with the Plane of the Horizon, (which indeed is the Caſe of all Veins of Coal throughout *England*,) but moſt Times *inclining* to it, (according to which it cleaves into Blocks at the Diſcretion of the Workman,) that it burns away with a ſweet white Flame, and into white Aſhes without Cinder. Of this ſort there is great Plenty in all Parts of the County, eſpecially the Places above-ſaid; that moſt commonly there are Twelve or Fourteen Collieries in Work, and twice as many out of Work, within Ten Miles round; ſome of which afford Two, Three, Four, or Five Thouſand Tons yearly, the Upper-Beds above the Iron-Stone lying ſometimes Ten, Eleven, Twelve or Fourteen Yards thick; ſo that ſome Acres have been ſold for 100 l. each, and one for 150 l. and from one Shaft hath been drawn Five Hundred Pounds worth of Coals.

In the Foreſt of *Kingswood*, near *Briſtol*, are very conſiderable Collieries; which not only furniſh that large City with Firing, but alſo the whole Country: In *Wales* there are alſo Mines of Coals; and on *Mendeep* Hills in *Somerſetſhire*, there are great Plenty of Coal-Works, and almoſt all other Mines.

But that which calls for our greateſt Regard and Notice in this Article of Coals, is the ſurpriſing Quantity of them, and the ingenious Method of conveying them to the navigable Rivers in the Biſhoprick of *Durham*, and the Parts about *Newcaſtle*. As far as appears to the contrary, there is no doubt to be made but theſe Treaſures lie hid in the Bowels of the Earth, in ſome Places ſhallower, in others deeper, almoſt all over the County of *Durham*; and it is not uncommon for the Miners to ſink Fifty, Sixty, and Seventy Fathom in ſearch of theſe Riches; which, when found by the Contrivance and accompliſh'd Skill of the Owners, are with great Expence made to anſwer the Purpoſes of getting vaſt Eſtates, of employing great Numbers of poor People, and furniſhing all the Sea-Ports in *Europe* with vaſt Quantities of excellent Fuel, but eſpecially the City of *London*, which would otherwiſe remain under a miſerable Degree of Want.

That vaſt City is almoſt wholly ſupplied with theſe Coals, and (were it not for the Duty laid on them) at a very eaſy Expence: Which Expence is yet made heavier by a certain Number of Men in *London* called *Crimps*, who monopolize them, and engroſs the whole Market in the Summer, and ſet their own Price in the Winter on thoſe who are forced to buy them.

Thoſe who are acquainted and are converſant with the Collieries, know there is great Difference in the Goodneſs of them. There are what they call *Three Quarter* and *Five Quarter* Coals, which are the firſt and eaſieſt come at; but that they call the *Main Coal* is what lieth deepeſt, and is every where accounted *beſt*; and they are ſuch as are almoſt univerſally ſent abroad to Market; and the other are ſold cheaper at home. But there is alſo a Difference in the Goodneſs of theſe, though the Monopolizers at *London* make none, when they mix them all together; and even the *beſt*, which are ſent out of the Biſhoprick, are all called *Newcaſtle* Coal.

It is to little Purpoſe to mention the ſeveral *Strata* or Veins of Earth, thro' which they dig before they come at Coal; becauſe theſe are different in different Places: But in all of them there are vaſt Varieties; and ſometimes they meet with Rocks of Stone almoſt impenetrable, the hardeſt of which they do however overcome with Gun-powder, or with continual Labour. But the greateſt Annoyance, and hardeſt to be overcome, is *Water*; which often pours upon them from *Bags* and unforeſeen Currents, and would deſtroy all at once, if a ſeaſonable Remedy were not applied. The Method of which, as it is now uſed and much improved by the polite Men of the *North*, is one of the greateſt Inſtances of the real Uſe of Philoſophy and Mathematicks to Mankind rightly applied.

The *Engine* or Contrivance for Drawing Water by the Help of Fire, is the ingenious Invention of the late Mr. *Savory*, F. R. S. which Mr. *Bradley* has curiouſly delineated on a *Copper Plate*, and particularly deſcribed the Nature and Method of its Operations: But as it is now grown into more common Uſe, is ſo thoroughly well underſtood, and ſo much improved, eſpecially in the *North*, of late Years, I ſhall ſay little more about it here, except what is to my preſent Purpoſe, *viz.* That this *Fire-Engine* is now ſucceſsfully uſed, not only to clear the Pits of Water, whilſt the Coals are winning; but alſo as an Inſtrument to rid them of all Water, even whilſt they are Sinking, by moving the *Sucker* or *Pipe* from one Side to another, as they go down Step by Step; which not only ſaves a great deal of Charge, but makes great Expedition. Of the Uſes and Application of this Engine may be found a full Account in the Inventor's Book call'd the *Miner's Friend.*

The Charge indeed firſt of *making*, and afterwards of *working* the Fire-Engine is very *conſiderable*, and would any where elſe but in a Country of Coals be *inſupportable*: But *here* it is to be taken Notice of, that the *Engine* works its own *Life*; and whilſt it removes the Water, it helps at the ſame time to procure Coal; which gives it *Breath*, and ſets it in Motion. However, the Conſumption of Coal being very great, hath of late put ſome upon Trials to effect the ſame thing by the *Air* and its elaſtical Power; but this being one of thoſe Things which are *true* in Theory but *falſe* in Practice, it is found by Experience not to anſwer; by reaſon the Diſcharges are too ſlow, and not frequent enough to remove the Load of Water to be diſcharged.

But, beſides the Ingenuity uſed in applying the *Powers of Nature* for the gaining theſe Coals, *mechanical Powers* are alſo uſed with no leſs Art for the conveying theſe Coals to the ſeveral Parts of navigable Rivers. For the *Waggons* and *Waggon-Ways* are ſo curiouſly contrived and ſo rightly adjuſted, that one Horſe is able to draw Four Thouſand Five Hundred Weight of Coal at Four Miles Diſtance, and to go backward and forwards four times in a Summer's Day. The Waggon-Ways are contrived and made to be as near an horizontal Level as is practicable, and to run with two parallel Lines made of Oak Spars, kept ſteady by croſs Pieces; and at the exact Diſtances of the Waggon Wheels, which preſs upon them, not in an exact Plane, but a little *obliquely*, the better to keep them in their Places. The Waggons are made ſquare and tall, wider at the Top than at the Bottom, and are carried by Four Wheels, of about Two Foot diameter, made of ſolid Oak.

But becauſe *Wood* preſſed upon by *Iron* would quickly wear out, therefore the Wheels are not *ſhod*, except ſometimes in ſuch Places where there is found ſome Decay. On which Account however, the *Motion* being ſometimes violent, and the *Friction* very great, there is found ſome Hazard of the Wheels being ſet on Fire. To prevent which, and the violent Motion on every little Declivity, they are forced to take out the Horſe, and to let him *follow*; and to make the Friction fall in more Places than one, as well as to hinder too violent a Motion forward, there is alſo a Contrivance of a ſtrong Piece of Wood fixed on one Side of the Waggon on a Centre in the Middle, called a *Convoy*: Which *Convoy* in the Hands of the Governor is preſſed upon more or leſs, like a *Leaver*, and is ſo contrived as to occaſion the other End to preſs on the Edges of the Wheel; whereby a greater or leſſer Friction being made, the Motion of the Waggon is regulated as Circumſtances and Neceſſity require.

After the Coals are thus with Safety *convoy'd* to the *Steaths*, or Keys by the River-ſide, where they are to be unloaded into the Keels, *here* alſo there is no leſs Ingenuity and Mechaniſm uſed for Diſpatch and Expedition; for the Steaths being made in the Form of wooden Bridges, the Horſe by an eaſy Aſcent draws up his Load to the Top, which is ſometimes Twenty Foot above the Surface of the Water. *There* the Horſe is looſed, and the loaded Waggon by one Man is moved into its proper Place deſigned for unloading; the Foundation whereof being contrived to turn altogether upon a Centre, the Whole is turned *half round*, and by pulling a Board out of the Bottom of the Waggon, the Coals immediately tumble out into a Spout, which conveys them next way into the Keel lying in the River. And altho', as I ſaid, each Waggon contains no leſs than Forty Four or Forty Five Hundred Weight, they are all emptied into the Keel in leſs than half a Minute. The Reaſon of the Waggon's being turned *half round* upon a Centre is, to put it into a Poſture of going off empty on another Frame of Wood ſide-ways. By this Means there is a conſtant Succeſſion of loaden and unloaden Waggons, from Morning to Night, coming and going without any Interruption.

I have been the more particular on this Head, that People in the *South*, who are apt to entertain ſtrange and monſtrous Opinions of the *North*, as if it wanted both Sun and Senſe, as well as the Neceſſaries of Life, may form right Ideas of Men and Things: For if Trade, and Riches, and a Multitude of People; if Plenty of the Comforts and Conveniencies deſirable in Life; if the Improvement of ingenious Arts and Sciences, and a polite and elegant Way of Living and Converſing: If all or any of theſe are real Indications of the Beauty of any Country, or the Wiſdom of any People, this Part of the *North* makes a pleaſing Diſcovery of them all. It may be *envied*, but with Knowledge it cannot be *pitied*.

But yet as rich and as polite a People as are here ordinarily to be found, I have often ſmiled with my ſelf to think, that the Riches and Trade of this Country are ſupported and maintained chiefly by three ſeeming *Abſurdities*: For in the Buſineſs of the Collieries, it ſo happens, that they are ſometimes *drowned for want of Water*; you frequently ſee here the *Cart before the Horſe*; and almoſt every Day in the Year they *carry Coals to Newcaſtle*. The *Firſt* Caſe happens in a dry Summer, when their *Feeders* fail them at the Fire-Engine; the Rivulet that ſhould ſupply the Engine with Water, hardly conveys enough to keep it working, whereby the Water in the Pit is in danger to get head of them. The *Second* is every Day ſeen, when the Coals are going down-hill; they are forced to take the Horſe out, and let him *follow* the Cart, which of itſelf, tho' loaden, goes upon the Frames faſt enough (ſometimes too faſt) when there is any conſiderable Declivity. The *Laſt* needs no explaining.

Cowkes are the Cinders of Coal, made in the following manner: The Collier ſets Six or Eight Waggon-Loads of Coal in a round Heap upon the Ends, and as Pyramidal (*viz.* large at Bottom and ſmall at Top) as they will ſtand.

If it be a windy Seaſon, he ſets Fleaks to ſhelter it; and then into a Hole left in the Middle to the Top of the Heap, or Pit as they call it, he throws a Shovel full or two of Fire, which by ſpreading itſelf each way fires the Pit round; this burns and blazes till the Smoak and Flame ceaſes, and it is all of a red Fire; then he covers all the Heap with Duſt, and that Side firſt which by the help of the Wind burns moſt, or where the Fire firſt breaks out, which immediately damps it and makes them dead Coals, which thus ſtand till next Morning, or longer according to the Occaſion; and then with a Rake, like a Gardener's, having Six or Eight Teeth, he pulls them down round the Heap, and the Duſt falls to the Bottom, which is thrown up on a Heap to damp the next Pit.

It is obſerved, that Three Hundred of *Coals* make but One Hundred of *Cowkes*, and the lighter they are the better; if they are curiouſly burnt they will gingle like common Cinders, and a Sack of Six Buſhels will weigh about One Hundred Weight.

The reaſon of the *North-Country* Pale Malt being ſo fine and ſweet, is imputable to the Drying it with *Cowkes*; and it is not much above half a Century of Years, ſince the Malſters at *Derby* dried their Malt with Straw (as other Places now do) before they uſed Cowkes, which have made that Alteration ſince, that all *England* admires.

Other Countries have as good Barley and Malſters as *Derby*; but for want of theſe burnt Coals, the Malt that is made is much inferior to what is made *there*, and in the other Parts of the *North*, with the Cowkes above-mentioned.

Of BRICK-MAKING.

BRick-Making is a great Improvement of the Profits of Land: And there are chiefly two ſorts of Bricks, *viz. Stock-Bricks* and *Place-Bricks.* The firſt are ſtrongeſt and hardeſt, made of Hazel Mould or Stiff Loam, Nine Inches long, Four Inches and a half broad, and Two Inches and a half thick. The Earth is dug about *Martlemas*, and tempered about *Lady-Day* following; after which it is made in a Mould, attended with a *Water-Trough*, *Sand*, a *Strike*, and *Pallate-Boards*.

The Earth being prepared is moulded like Dough, and ſanded like Flower, and laid on a *Balk* edge-ways; and when pretty dry another Courſe is laid croſs them, and ſo for Ten Courſes, then covered with Straw till dry. They are in new Ground burnt in a Kiln; but afterwards the *Clamp* is covered with burnt Bricks.

There are uſually employed about a Stool's Work, Four Men and Two Boys: The Firſt, an *Earth-Maker*, that prepares the Earth: The Second, a *Carter*, to bring the Earth to the Stool: The Third, an *Up-Striker*, a Boy, that lays the Earth upon the Table, and cuts it out for the Moulder: The Fourth, the *Moulder*, who makes the Bricks in the Mould: The Fifth, an *Off-Bearer*, a Boy, who carries the ſame in the Mould, and lays them abroad upon the Ground: The Sixth, an *Up-Ganger*, who a Day or two after, as they become ſtiff, takes them up, and ſets them in Wind-Rows to be dried; and when they are enough dried, they are to lay them in the Kiln for Burning.

A *Stool* does ordinarily make (if the Men work by the Day the uſual Hours) *Six Thouſand* a Day; but if the Men work by the Great, beyond their uſual Hours, they will make *Eight Thouſand* Bricks in a Day. One Man, without Help, will make a Thouſand in a Day; but with a Temperer and Boy, Two or Three Thouſand, *&c.* The Six Perſons employed have but Three and Twenty Pence the Thouſand; the Moulder Five Pence; the Earth-Maker, Carter, Off-Bearer and Up-Ganger Four Pence each; and the Up-Striker Two Pence.

A Piece of Ground of Ten Spades, which is about Thirty Three Foot Square, will make an *Hundred Thouſand* of Bricks; and the Digging it amounts to One Pound Five Shillings, which makes it Three Pence the Thouſand. Two Hundred Thouſand of Bricks, made to be burnt in One or Two Clamps, will require about Four or Five Loads of Wheaten Straw; (tho' Rye Straw is eſteem'd better than Wheat, becauſe it is tougher, and will bend and carry off Wet better;) and the Expence of Straw is much the ſame as Digging. Of Coals, about a *London* Chaldron goes to every Ten Thouſand of Bricks, and ſo Ten Chaldron to One Hundred Thouſand: But ſome ſay Five Chaldron will ſerve; and that Ten Load of Straw will be ſufficient for Ten Hundred Thouſand Bricks. The Coſt of Coals, by the firſt Computation, comes to about Twenty Shillings the Thouſand Bricks, but much cheaper ſtill where Coals are plentiful.

A Load of Sand ſerves for Six Thouſand Bricks. In *Ruſſia*, 'tis ſaid they uſe Sun-burnt Bricks; and Mr. *Houghton* ſays, a Gentleman of *Bedfordſhire* did the like to good Purpoſe. Powder of Bricks is good for ſeveral Uſes, particularly for Scouring of Metals, and ſome uſe it for Manure; the Reaſon whereof is, that by the Fire it is made porous, and ſo fitted to imbibe the Nitre or *Spirit* of the Air, by which means it opens and relaxes, and ſo fertilizes the Earth.

Tiles are made with ſomewhat finer Earth than Bricks, better tempered and harder baked.

A
NEW SYSTEM
OF
AGRICULTURE
AND
GARDENING.

BOOK II.

CHAP. I.

Of the ſeveral ſorts of Forreſt and Timber Trees great and ſmall, Ever-greens, and flowring Shrubs, ſuch as are found to grow in England *without Houſing, ſhewing their Nature, Uſe and Virtues.*

THE great and ſenſible Decay and Want of Timber for theſe late Years ought to inſpire every generous Spirit and Lover of his Country with a Zeal and Paſſion for *Planting*, that may give him a more comfortable View, and ſuch as late Poſterity may bleſs and praiſe him for. The Avarice of ſome and the real Wants of others, have of late Years ſtrangely impaired the Riches of the Forreſt. And I doubt it is ſtill a growing Evil, ſuch as may in time have a very Melancholy Effect on our Navy, which hath been ever thought the Glory as well as the envied Bulwark of theſe Kingdoms, if not ſome way or other put a Stop to. The Timber of an Eſtate, either dip't or mortgaged, is the firſt thing that the imprudent unthinking Heir lays his hand upon, as what is to bring him in *ready*

Money; not ſo much perhaps to pay his Father's Debts or Siſters Portions, as to ſupply him with *Tools* for Gaming, and *Neceſſaries* (as he calls them) to ſupport his Luxury, and criminal ways of Pleaſure.

I ſhall not at preſent give theſe Perſons the Satisfaction of ſmiling at me, for *Preaching* them out of theſe dangerous Gaieties as a Divine; but I hope they will ſuffer me as a Lover of my Country, and a Promoter of its general Good and Intereſt, to ſet the Matter of Planting in ſuch a Light, and make the Manner of doing it ſo *eaſy* and *familiar*, that every one (as Occaſion and Circumſtances offer) may lend a helping hand to retrieve our paſt Loſſes, and at the ſame time ſee that he is doing ſomething that may be for his own *preſent* Pleaſure and Advantage, but moſt certainly for the Intereſt of his *Family*, and a *publick Good.*

The Learned and Ingenious Mr. *Evelyn*, was the firſt that gave the World a right ſenſe of this thing, and went to the Bottom of the whole Myſtery of Planting *Forreſt-Trees.* Even the preſent Age may bear the Repetition of his Truths; and as there are others of late who have enlarged this Knowledge by further Experience and Obſervation, I ſatisfy my ſelf, that all Curious and Inquiſitive Perſons, ſuch at leaſt as have a Taſte and Reliſh for theſe rural Diverſions, will readily give us the Hearing, and think their time not ill ſpent, if they ſee now and then ſomething new, to ſtrike their Fancy, or to put them upon Experiments *Innocent*, *Diverting* and *Profitable.*

Soil. The firſt thing then that I ſhall ſpeak to, is the *Ground* or *Soil* proper to be choſen for a Plantation of *Wood.* And this being indeed the Foundation of the Whole of what is to be expected, it may be neceſſary to premiſe ſome general Rules concerning it. Now altho' Trees will many times thrive on coarſe Land, yet it is undoubtedly true that the deeper and richer the Soil is, the more proſperous and taller Trees you may expect; all Trees commonly growing ſhrubby, unfruitful, or unnaturally ſpreading on their Tops, where the Soil is either dry or ſhallow. However, I am not for making choice of the beſt Grazing or Meadow Ground, which turn to the greateſt Profit other ways; becauſe there are many ſorts of Land not worth above five or ten Shillings an Acre, not very good for either Corn or Graſs, that will do very near as well for *Forreſt-trees.* What I would therefore chuſe (if choice may be had) ſhould be of the *Loamy* nature, and ſuch too where neither Spade nor Plough has ever come, which I call *untried Earth.* It is thought that all Soils whatſoever may be reduced to theſe three general Heads; *Sand*, *Loam*, and *Clay*: Every one of which are alike tending to Vegetation, as having their Proportions of Salt, and vegetative matter. But whereas *Sand*, tho' it is haſty in its productions, yet by its *ſlipperineſs* and too eaſy Separation of its Parts, ſoon loſeth its Riches and vegetative Power; and *Clay*, whoſe Parts are *cloſely* wrought together, will not part with the Vegetative matter therein contained, nor eaſily ſuffer the Fibres of Plants and Trees to make their way thro' it; but if its Parts are ſeparated by digging, and by a due mixture of Sand, or ſome ſuch ſlippery Body, kept open, we ſoon ſee the Effects of its Vigor and vegetative Power.

We find indeed *Clay* has certain Plants growing upon it, which are as it were *natural* to it, and thrive *better* in it than in any other Soil;

but then there is no ſuch thing as *pure Clay*; for by every Experiment made upon it, there is always found to be ſome Mixture of *Sand.* And *Sand* likewiſe hath its *natural* Plants, which delight in it, and will not proſper ſo well elſewhere; but then alſo it muſt be ſaid thar all *Sandy Soils* have a great deal of other Mould and vegetative Matter mix'd with it. So that when it happens that a Soil hath a due and proper Proportion of theſe two, *Sand* and *Clay*; this is what may be called *Loam*; the *Middle* betwixt the two Extremes, and which hath therefore this Property belonging to it, that the Trees natural to *Clay*, and thoſe natural to *Sand*, will both equally grow and proſper in a *Loamy Soil*, as *Loam* partakes of the Qualities both of *Sand* and *Clay*.

From all the Obſervations I have made about the Natures and Properties of Soil, this I take be right Reaſoning; and the *Uſes* to be made of it are many; but I ſhall only at preſent, (beſides what is to our Purpoſe in the choice of Soil for a Plantation) obſerve by the way; that in all our Mixtures and artificial Compoſts contrived to forward Vegetation, we ſtrive to imitate *Nature*, and avoid all indigeſted Dungs and *forcing* Ingredients. Theſe, tho' they *haſten* Nature, yet make her *tire* by the way. Whereas in the growth of Plants, Nature's, like the Carriers Pace, is beſt; *Fair and Softly.* Wherefore Dr. *Agricola*'s ingenious Whim of accelerating the Growth of Forreſt-trees by an artificial *Mummy*, tho' it may excite Wonder and Curioſity, yet is by no means to be made a common Practice: for ſuch methods have plainly the ſame Effects in Trees as the uſe of hot and ſtrong Liquors has in Men: They *raiſe* their Spirits, but *ſhorten* their Lives.

After what I have here ſaid about a *Loamy* Soil and *untried* Earth, as what are to be preferred as the beſt Foundation whereon to raiſe Woods and Forreſts, the diligent Planter will not be at a Loſs to know how to chuſe. And yet if he cannot *chuſe* as he would, he ſhould not yet *refuſe* every Soil that is not exactly agreeable to *Loam*; becauſe as I have obſerved, ſome Trees will thrive in the *ſtrongeſt Clays*, as the *Oak*, the *Lime* and *Fir*: And others will alſo thrive in *Sand* or *Gravel*; as the *Walnut*, the *Aſh*, and the *Sycamore*: and others again will flouriſh moſt in *low and Marſhy* Grounds, as the *Poplar* the *Abele* and the *Willow*.

The Seminary.

When therefore a right and proper Place is pitch'd on for a *Seminary* or *Nurſery* of Forreſt-Trees, (well guarded if poſſible from the *North* and *Weſt* Winds) let it firſt be cleared of all *Whins*, *Buſhes* and other Trumpery; and then let it be thro'out well trench'd with the Spade *two ſpit* deep, caſting the upper part or Surface of the Earth *undermoſt*. This may be thought a conſiderable Charge, but the quick Growth of the Trees will abundantly repay and anſwer it. There is no need to ſtay, to give this Nurſery a Summer and Winters Mellowing, as ſome (weakly enough) have adviſed; but let the one half of it be well work'd with the Harrow in *October* and laid into Beds about four Foot wide, and the other half (that eſpecially which may ſeem to want mellowing by the Froſt in the Winter) may be let alone till the Spring, for there are thoſe two Seaſons for ſowing the *Maſt*, and *Both* of them are ſometimes attended with Misfortunes; and beſides, ſome Seeds are beſt ſown in *Autumn*, and others in the *Spring*.

The Seed. The Ground then being prepared and ready for ſowing, and a ſuitable Place allotted for different Seeds by themſelves, chuſe the ripeſt and ſoundeſt Seed of every ſort, ſuch as eaſily ſhake from the Boughs of the moſt thriving Tree; the ſhape and weight of the Seed inform which is the beſt, and how they may be ſet, lying on one ſide with their ſmall End to the Earth, from which part they put forth the Root firſt, which when it hath laid hold of the Ground, from the ſame Place ſends forth the Shoot which is to form the Tree. Altho', as I have obſerved, both Seaſons are proper for ſowing Maſt, yet it is by many thought that the Maſt of all Trees ſhould properly be ſown when Nature directs, eſpecially *Acorns*, viz. as ſoon as they are ripe. For thoſe which are ſown in *Autumn* have been obſerved for the moſt part to ſucceed, whereas thoſe ſown in *Spring* ſometimes miſcarry and fail; owing (as ſome think) to the Rooks and Mice which are then greedy of them; whereas they are otherwiſe employ'd in *Autumn*: And yet before *February* the Seed will be diſpoſed for Growth; and the Land not being then freſh and new broke up, the Rooks, &c. will not be tempted to ſeek for Food, as they always do in new broken up Ground: However ſtill it is good to make uſe of both Seaſons.

Being thus provided with Seeds of all Kinds, it is ſtill to be conſidered what ſorts are proper to be *Sown* and what to be *Set*. The heavy and larger Seeds are more proper to be *Set* regularly in Rows with a Line; ſuch as *Acorns*, *Cheſtnuts* and *Walnuts*; which laſt are ſtill beſt to be planted with the Green Husk on, the bitterneſs whereof prevents the Mice meddling with them, which otherwiſe they are very greedy of. The *Sycamore*, *Beech*, *Elm* and *Aſh*, are moſt proper to be ſown; tho' it ought to be remembred that the *Aſh Keys* (for Mr. *Bradley* either forgot himſelf or miſtook) will not come up till the ſecond Year; and therefore the beſt way is to gather them as you do Haws, and lay them by in Heaps for a Twelvemonth, till Seed-time. Many ſorts of Trees may be propagated by Layers, which is done by ſlitting the Branches a little way with a Croſs cut, and laying them half a Foot under Mould, and if they do not well comply, peg them down with a Hook. Other Trees may be raiſed of Cuttings, as the *Willow*, *Poplar*, and *Alder*. And many alſo from Suckers which come from the Roots: But ſtill the beſt and ſafeſt way is (I think) from the *Seed*, for theſe Reaſons: (1.) Becauſe they *take* ſooneſt. (2.) Becauſe they make the handſomeſt Trees and moſt uniform ſhoots. (3) Becauſe they will neither require ſtaking nor watering, as tranſplanted Suckers and Layers do.

Careful weeding of this Seminary and Nurſery for the firſt two or three Years hath been generally thought a very neceſſary piece of Care and good Husbandry; but I have been told from an Ingenious and old Practitioner and Planter, Sir William *Huſtler* in *Yorkſhire*, that in the Progreſs of his Plantation he has found very little difference betwixt *careful weeding* and *not weeding* at all. It muſt be owned that the great Care and Charge which is commonly beſtowed on the *Weeding* a Plantation is what hath *tired* many, and *frighted* more; and if the Succeſs be no way equal to the Charge, the beſt way is to truſt the Plantation to Nature, well guarded from foreign Invaſions of Cattle. Exact *weeding* he hath obſerv'd hath greatly let in the Summer drought, and ſtunted the Seedlings; and if Weeds may a little over-ſhadow the Plants, ſtill they keep the Ground cool and moiſt, which balances the other Inconvenience. The Trial both ways is eaſily made, and I am apt to think if only ſome of the larger Weeds that ſhoot upwards were removed, this Method of Sir *William*'s is beſt and moſt rational.

After the Seedlings are two or three Years old, where they are thickeſt, ſome ſhould be drawn and tranſplanted into other parts of the Nurſery at proper Diſtances, and the reſt remain for Trees; always ſuppoſing ſtill that the whole be well defended from the Brouze of Cattel, till they are got out of their reach: If at any time you diſcover in the Nurſery an aukward ill-ſhapen Tree, the beſt courſe you can take, is to cut it off ſlopewiſe at the bottom where the Crookedneſs begins, and the next Year you will find it to make one ſtrait ſhoot, and will quickly recover that Diſcipline ſo as to make a fine handſome Tree: I have ſeen at *Greencroft* at my Friend *James Clavering*'s, Eſq; a young Oak thus ſerved, and I found from the Place of Amputation it had ſhot in one Summer more than three Yards perpendicular. The Objection which ſome make to this, that it ſpoils the But-end when it comes to be Timber, is of little weight, becauſe it is ſuppoſed to be cut near the Ground, and then only too when the Tree will not otherwiſe be brought into ſhape and vigor. A *ſmall* Crookedneſs in a young Tree is much mended by a gentler Diſcipline, *viz.* Cutting it in the *Ham tranſverſly* and *perpendicularly*, three Inches above and three below the place of bending.

Thus much may be thought ſufficient to be ſaid of Nurſeries and preparatory Seminaries in general; what Directions and Rules are wanting with reſpect to particular Trees will be taken notice of when we come to treat of thoſe *particulars*: In the mean time, that I may proceed regularly, I ſhall ſet down here a compleat Catalogue of all ſorts of Trees great and ſmall, ſuch as are found to grow in *England* without Houſing, dividing them into four Claſſes, *viz.* (1.) Large *Forreſt-Trees.* (2.) *Forreſt-Trees* of a leſs and humbler Size. (3.) *Ever-greens.* And (4.) *Flowring Shrubs.* And I put them here in this View, becauſe ſuch a Collection and compleat Catalogue as this, I have long ſince thought would be a Curioſity that any Gentleman, who is a Lover of Vegetables, ſhould naturally deſire to have in ſome one part of his Ground, where he may at one View behold all the Sorts and Varieties of Trees and Shrubs, which his Native Country by art and care is made to preſent him every Day in the Year. Theſe may be made a very goodly Sight, by having only one of every ſort; and Rows of each Claſs placed ſo diſcreetly one before another, the talleſt *firſt*, the humbler ſort of Forreſt-trees *next*; the Ever-greens *next*, and Flowring Shrubs in the *Front.*

Here then followeth the Catalogue under their ſeveral Claſſes.

Large Forreſt Trees.

The Oak { with its Miſcletoe.
The Aſh.
The Elm { Witch, *Engliſh* and *Dutch*.
The Beech.
The Abele.
The Aſpine.
The Poplar.
The Walnut.
The Lime { broadleav'd and wild.
The Sycamore.

Leſſer Trees.

The Alder.
The Birch.
The Hazel and Filbert.
The Horn-beam.
The Maple.
The Serviſe.
The Wild Pear.
The Crab.
Mulbery { Black and White.
The Cheſnut.
Horſe Cheſnut.
Wild Cherry { Black and Red
The Quick-beam.
White Thorn.
Black Thorn.
Glaſſenbury Thorn.
The Withy.
The Sallow.
The Ozier.
The Willow, { Red, White, Sweet.
Tamaris
The Plane.
The Elder.
The Medlar.
L'Azzerole.

Leſſer Trees.

The Lotus, or Nettle-Tree.
The Cornel-Tree.
Larch or Larix.
Bucks-horn.
Acacia.
Buckthorn.
Hackberry Tree, whoſe Fruit is harſh and unpalatable.
Hickery Tree from Carolina.
Cotton Tree.
Muſcovy Apple Tree.
Mirabolan Plum.
Manna Aſh.
Canada Berberry.

Ever-greens.

The Ilex { dwarf and tall.
The Holly: of many Sorts.
The Eugh.
The Phylerea.
Alaternus.
The Box.
Cork-Tree; 2 Sorts.
Juniper { *Engliſh* and *Swediſh*.
Laurel { *Engliſh*, Cherry, *Alexandrian*
Cypreſs.
Fir, { *Scotch*, Silver and *Norway*.
The Pine.
Arbor Vitæ.
Ivy, ſtrip't and plain.
Savine.
Pyracantha.
Celaſtrus or Staff-tree.
Arbutus.
Cedar, { *New-England*, *Virginia*, *Bermudas*, *Lebanon*.

Ever-greens.

Roſemary. { common, broad-leav'd.
Roſem. ſtrip'd, { White, Yellow
The Bay.
Laurus-tinus.
Privet.
Lentiſcus or Maſtic-tree.
Maternus.
Butcher's Broom.
Prickly Box.
Sothorn Wood.
Snow-drop Tree.
Groundſel-Tree from Virginia.
Olcaſter.

Flowring-Shrubs.

Sena Tree.
Laburnum.
Maracoc or Paſſion-tree.
Honyſuckle, ſeveral ſorts.
Pomgranate, { Fruit and double fl.
Solanum, { Strip'd and Plain.
Meſerion, { Yellow and Scarlet Berry.
Gilder-roſe.
Roſe; of ſeveral ſorts.
Lilac.
Almond, { Dwarf and Standard.
Jeſſamine, { White, Yellow, Strip'd, and Purple.
Althea frutex. { Purple, White.
Tulip tree.
Spirea frutex.

Spaniſh

Flowring-Shrubs.

Spaniſh Broom.
Syringa.
Dog-tree.
Sea Ragwort.
Barba Jovis.
Virgins Bower.
Periwincle.
Amara dulcis.
Olive-tree,
Oleander, or } tender.
Roſe-bay,
Agnus Caſtus.

Flowring-Shrubs.

Cytiſus or Bean Trefoil.
Sage-tree.
Primroſe-tree.
Dwarf Plane or Whitten-tree.
Sea-Holly.
The Linden, Lime-tree, or Wild Lemon.
The Carob or Bean-tree ſweet.
The Ciſtus.
Bladder Nut.

Flowring-Shrubs.

Balm of Gilead.
Piſtacia-tree.
Benjamin-tree.
Caper-tree.
Cackinea, or Tea-tree.
Coccigria.

Large FORREST-TREES.

Oak Tree.

THE Oak is a large *Glandiferous* Tree, of a hard laſting Wood, rugged Bark, and Leaves waved on the Edges.

Of this Tree much is to be ſaid; but the beſt Account I can give is, that a piece of Ground reſpecting the *South-Eaſt*, rather than *full South*, and well protected from the *North* and *Weſt*, is the beſt for a Seminary or Seed-Plot: This ought to be broken up before the Winter you ſow, to mellow it, eſpecially if it be a Clay, and then the Furrow would be made deeper, or ſo at leaſt as you would prepare it for *Wheat*: Or which is beſt of all, you may *trench* it with the Spade; by which means it will be the eaſier cleanſed from all Obſtructions: Then having given it a ſecond ſtirring with a Harrow immediately before you ſow, caſt and diſpoſe it into Rills, or ſmall narrow trenches, of four or five Inches deep, and in even Lines at two Foot Interval; for the more commodious Runcation, Hawing, and Dreſſing the Trees. Into theſe Furrows ſtrow your Acorns, not too thick, and cover them well with a Rake or Harrow: But (to be more accurate) *Set* them as you do Beans. Do this in the *ſtiffer* Grounds at the latter end of *October*, and in the *lighter* about *February*.

Let the *Acorns* be gathered in their juſt Seaſon, that is, when *dropping* ripe, and from fair *thriving* Trees: And ſix Buſhels of Acorns will ſow or Plant an Acre of Ground, at one foot Diſtance. Your Plants when they begin to *peep*, ſhould be Earthed up, eſpecially after breaking of the greater Froſts, and when the ſwelling Mould is apt to *Spue* them forth; but when they are about an Inch above Ground, you may in a moiſt ſeaſon draw them up where they are too thick, and ſet them immediately in other *Lines* or *Beds* prepared for them; or you may plant them in double *Foſſes*, where they may abide till they are of a fit ſtature to be tranſplanted; and then they ſhould be ſet at ſuch Diſtances as the ſeveral kinds of *Oaks* require; but if you draw them only for the thinning of your *Seminary*, prick them into ſome empty Beds at one foot interval, leaving the reſt at two or three.

When your Seedlings have ſtood thus till *June*, beſtow a ſlight digging upon them, and ſcatter a little half-rotten Lither, Fearn, or old Leaves among them, to preſerve the Roots from ſcorching, and to retain the Moiſture; and then in *March* following, you ſhall chop it all into the Earth, and mingle it together: Continue this Proceſs for two or three Years ſucceſſively; for till then the ſubſtance of the Kernel will hardly be ſpent in the Plant, which is of great Import; but then (if the ſtature of your Plants invite) you may ſet them forth, carefully taking up their Roots; and cutting the ſtem within an Inch of the Ground, (if the Kind ſuffers the Knife) ſet them where they are to continue: If thus you reduce them to the diſtance of forty Foot, the Intervals may be planted with Aſh, which may be felled either for Poles or Timber without prejudice to the Oak. Some repeat the cutting we ſpeak of the ſecond Year, and after *March* re-cut them at at half a foot from the Surface; and then meddle with them no more: But this muſt be done with a very ſharp Inſtrument, and with Care, leſt you violate or unſettle the Root; which is to be practiſed upon all thoſe that you did not tranſplant, unleſs they are very thriving Trees; and then it ſhall ſuffice to prune off the Branches and ſpare the Tops; for this Amputation eſtabliſhes your Plants by diverting the Sap to the Roots, and frees them from the Injury of the Winds, and makes them handſome ſtreight ſhoots, infinitely preferable to ſuch as are abandon'd to Nature and Accident without this Diſcipline: By this means the Oak will become excellent Timber, ſhooting into ſtreight and ſingle ſtems: To this I am to add, that as often as you make your annual tranſplanting out of the Nurſery, by drawing forth the choiceſt Stocks, the reſt will be improv'd by a due ſtirring and turning of the Mould about their Roots.

In planting preſerve the Roots, and eſpecially the Earth adhering to the ſmalleſt Fibres, which ſhould by no means be ſhaken off; for thoſe tender Hairs are the very Mouths and Vehicles which ſuck in the Nutriment, and transfuſe it into all the parts of the Tree; and theſe periſhing, the larger Roots, hard, and leſs ſpungy, ſignify little but to eſtabliſh the ſtem: Therefore we ſhould bind the Mould about them, or transfer the Roots in Baskets, to preſerve it from forſaking them; for this Earth being fitted to the Mouths of the Fibres, it will require ſome time to bring them in Appetite again to a new Mould, and may be dangerous.

The Pits and Foſſes, into which is deſign'd the Tranſplantation, ought to be prepared and left ſome time open to macerating Rains, Froſts and Sun, that may reſolve the compacted Salt, render the Earth friable, mix and qualify it for Aliment, and to be more eaſily drawn in and digeſted by the Roots and analogous *Stomach* of the Trees: This to ſome degree may be *artificially* done, by burning of Straw in the newly open Pits, and drenching the Mould with Water, eſpecially in over dry Seaſons.

There is no certain Rule at what Diſtances Trees ſhould be planted; for various quantity of Soils will make alteration. If thoſe that affect cold and moiſt Grounds be planted in hot and dry Places, then ſet them in cloſer order; but Trees which covet ſcorching dry Grounds, at farther Diſtance. The like may guide in Situations expos'd to impetuous Winds and other Accidents; which may ſerve for general Rules.

To contribute to the Stability of our tranſplanted Trees, ſomething is to be premiſed concerning their *ſtaking*, and ſecuring them from external Injuries, eſpecially from Winds and Cattle; againſt which, Copices and Woods are ſufficiently defended by the Mounds and their cloſer order; eſpecially if they riſe of Seed: But where they are expos'd in ſingle Rows, as in Walks and Avenues, the moſt effectual courſe is to *empale* them with three good quarter Stakes, of competent Length, ſet in a Triangle, and faſtned to one another by ſhort pieces above and beneath; in which a few Brambles being ſtuck, ſecure it abundantly, without that *choaking* or *fretting* to which Trees are obnoxious that are only ſingle ſtaked and buſhed as the vulgar manner is; and in this the Advantage is more than the Charge. Where Cattle do not come, a piece of Rope tied faſt about the Neck of Trees upon a Wiſp of Straw, to preſerve it from galling, and the other end tightly ſtrained to a Hook or Peg in the Ground (as the ſhrouds in Ships are faſtened to the Maſts) ſufficiently eſtabliſhes Trees againſt the *Weſtern* Blaſts without more trouble, for the Winds of the other Quarters ſeldom infeſt us: And if the Cords be well pitch'd they will ſerve many Years. But notwithſtanding all this, a noble Perſon tells my Author, that in *windy Scotland* he never ſtakes his Trees, but makes his Servants ſet up again thoſe that are thrown down; and thus they ſtrike Root ſo faſt, that nothing but the Axe is able to proſtrate them; for they looſen the Mould, and ſo prepare it to receive the better Nouriſhment.

The *Oak* carries it from all other Timber whatſoever for the building of Ships, being tough, bending well, ſtrong, and not too heavy, nor eaſily admitting Water. As to the variety of Oaks, there are four ſorts only; two of which are moſt frequently with us: The two frequent Oaks are the *Quercus Urbana*, which grows more upright, and being clean and lighter is fitteſt for Timber; and the *Robur*, or *Quercus Silveſtris*, which is of an hard black grain, bearing a ſmall Acorn, and affecting to ſpread in Branches, and to put forth its Roots more above Ground; and therefore in the planting to be allow'd a greater diſtance, *viz.* from 25 to 40 Foot (nay, ſometimes as many Yards) whereas the other ſhooting up more erect will be contented with *fifteen*. This kind is farther to be diſtinguiſhed by his fulneſs of Leaves, tarniſh, and becoming yellow at the Fall, and the Roots growing very deep and ſtraggling.

'Tis the propagation of theſe large ſpreading *Oaks*, which is eſpecially recommended for the excellency of the Timber, which require room to amplify and expand themſelves, and would therefore be planted in Forreſts, at more remote Diſtances, and free from all *Incumbrances*: for by *dreſſing*, and *due Culture*, many Years advance is to be gain'd.

Both theſe kinds ſhould be taken up very young, and tranſplanted about *October*; ſome, for theſe hardy and late ſpringing Trees, defer it till the Winter be well over; but the Earth had need be moiſt; and tho' they will grow tolerably in moſt Grounds, yet do they generally affect the *ſound*, *black*, *deep*, and *faſt* Mould, rather *warm* than *over-wet* and *cold*, and a little *riſing*: This produceth the fineſt Timber; for as ſays *Pliny*, this is a general Rule, What Trees ſoever which grow tolerably, either on Hills or Valleys, ariſe to greater Stature and ſpread more amply in the lower Ground; but the Timber is far better, and of a finer grain, which grows upon the Mountains. The Timber of thoſe Trees which grow in moiſt and ſhady places, is not ſo good as that which comes from a more expoſed ſituation, nor is it ſo cloſe, ſubſtantial and durable; but yet what is Wind-ſhaken never comes to good. Generally the cloſe-grain'd is moſt ſtout and permanent; and it is to be noted, that the *Oak* neither proſpers in very *hot*, nor exceſſive *cold* Countries: If I were to chuſe the Place for the Tree, it ſhould be ſuch as grows in the beſt Cow-paſture, or upland Meadow, where the Mould is rich and ſweet; and in ſuch places you may alſo tranſplant large Trees with extraordinary ſucceſs; and therefore it were not amiſs to bore and ſearch the Ground where you intend to plant or ſow, before you fall to work; ſince Earth too ſhallow or Rocky is not proper for this Timber, the Roots fix not kindly; and tho' for a time they may *ſeem* to flouriſh, yet they will be apt to dwindle. However, to remove all Diſcouragements,

Oaks proſper exceedingly in *Gravel* and *moiſt Clays*, even the *coldeſt Clay* that will hardly graze; but they frequently make ſtands as they meet with variety of footing; and ſometimes proceed again vigorouſly as they penetrate beyond, or outgrow their obſtructions, and meet better Earth; which is of that conſequence, that my Author affirms that more than fifty or an hundred Years advance is clearly gain'd by Soil and Husbandry.

In *Hampſhire* at a place call'd *Silceſter*, there have grown *Oaks* (ſome of which have contain'd ten load a Piece) out of the Walls, which ſeem'd to have ſtruck Root into the very Stones; and in the Forreſt of *Dean* ſome goodly *Oaks* have grown upon Ground which has been as it were a *Rock* of ancient Cinders, buried there many Ages ſince. But it is obſerv'd that *Oaks* which grow in rough ſtony Ground, and obſtinate Clays, are long before they come to any conſiderable ſtature; but in time (as has been before obſerv'd) they afford the moſt excellent Timber, having ſtood long, and got good Footing: The ſame we may affirm of the *lighteſt Sands*, which produce a ſmooth-grain'd Timber, of all other the moſt uſeful for the Joiner; but that which grows in the Gravel is ſubject to be ſhort and brittle.

Mr. *Evelyn* tells us he has made the Experiment of grafting the *Oak*, but with very little ſucceſs; altho' ſome affirm it will *take* the Pear and other Fruit: But for this curioſity he rather adviſes Inoculation. He does not much encourage the tranſplanting of young *Oaks*, except the Ground be extraordinarily qualified, or that the *Oak* be not above 6 or 7 foot growth in height: Yet if any will try, let their ſtems be of the ſmootheſt and tendereſt Bark; for that is ever an indication of Youth, as well as the paucity of their Circles, which in disbranching and cutting the Head off at 5 or 6 Foot height, may, before you ſtir their Roots, ſerve for the moſt certain guide; and then plant them immediately, with as much Earth as will adhere to them, in the Place deſtin'd for their ſtation; abating only the Tap-roots, (which is that downright and ſtubby part of the Roots all Trees rais'd of ſeeds do almoſt univerſally produce) and quickening ſome of the reſt with a ſharp Knife, but ſparing the Fibres, (which are the main Suckers and Mouths of all Trees) ſpread them in the Foſs or Pit which hath been prepared to receive them: Unleſs you will rather trench the whole Field, which is incomparably the beſt, and infinitely to be preferred before narrow pits and holes, in caſe you plant any number conſiderable. For the Earth is hereby made looſe, eaſier, and penetrable for the Roots, about which you are to caſt that Mould, which, in opening of the trench you took from the Surface, and purpoſely laid apart; becauſe it is ſweet, mellow and better impregnated: But in this Work be circumſpect, never to inter your ſtem deeper than you found it ſtanding; for *profound burying* frequently deſtroys a Tree, tho' it is an Error *ſeldom* obſerv'd: If therefore the Roots be ſufficiently cover'd to keep the Body ſteady and erect, it is enough; and the not minding this ſeemingly trifling circumſtance, does very much deceive our ordinary Planters and Woodmen: Moſt Roots covet the Air, (altho' that of the *Quercus Urbana* leaſt of any; for like the *Æſculus*,

How much to Heaven her tow'ring Head aſcends,
So much towards Hell her piercing Root extends.)

And the perfection of that does almoſt as much concern the Proſperity of a Tree, as of a Man himſelf.

Beſide what has been ſaid, the Poſition muſt be ſedulouſly obſerved; for the *Southern* parts being more dilated, and the Pores expos'd (as evidently appears in their horizontal Sections) by the conſtant Eccentricity of their hyperbolical Circles, being now on the ſudden, and at ſuch a ſeaſon converted to the *North,* does *ſtarve* and retard more Trees, how careful ſoever the Roots have been order'd, and Ground prepar'd, than any other accident whatſoever (neglect of ſtaking and defending from Cattle excepted); the Importance whereof ought to be conſidered; Mr *Evelyn* having ſometimes tranſplanted great Trees at *Midſummer* with ſucceſs (the Earth adhering to their Roots) and *miſcarried* in others where this Circumſtance only was omitted. The bigger the Tree, the more this Circumſtance is to be regarded.

To obſerve therefore the Coaſt, and the ſide of the Stock (eſpecially of Fruit Trees) is not a *trifle*, as ſome pretend: For if the Air be as much the Mother, or Nurſe, as Water and Earth, as more than probably it is, ſuch bloſſoming Plants as court the motion of the Meridian Sun, do as it were evidently *point out* the Advantage they receive by their poſition, by the clearneſs, politure, and comparative ſplendor of the *South* ſide: And the frequent Moſſineſs of moſt Trees on the oppoſite ſide, ſufficiently denotes the unkindneſs of that aſpect; and which is moſt evident in the Bark of *Oaks*, white and ſmooth; the Trees growing more kindly on the *South* ſide of an Hill, than thoſe which are expos'd to the *North*, with an hard, dark, rougher, and more Moſſy Integument, which has been experimented on moving ſome Trees to a *Northern* dripping ſhade. Whole Hedge-rows of Apples and Pears, have periſhed after their ſhelter has been remov'd: The good Husbands expected the contrary, that the Fruit ſhould improve, as freed from the predations of the Hedge; but uſe and cuſtom made the ſhelter neceſſary; and therefore a Stock for the time is the weaker taken out of a Thicket, if it be not well protected from all ſudden and fierce invaſions either of crude Air or Winds.

There are other Rules concerning the ſituation of Trees, altho' when ſomething ſhelter'd from *North*, *Eaſt*, and *Weſt*, 'tis beſt; as alſo from

Marſhes, unwholeſome Fogs, Hills and Seas, which expoſe them to the Weather; but particularly from thoſe *Sylvifragiventi*, our *cruel* and *tedious Weſtern* Winds; altho' thoſe which ſtanding in Winds do conquer and are not ſhaken, are the moſt ſtrong and ſolid, eſpecially Trees expos'd to the *North:* But a hot Gravel and looſe Earth doth ſeldom well; for an *Oak* in *good Ground* ſhall double its growth, tho' next to this (and perhaps before it) is preferr'd *good Air.* We ſhall ſometimes ſee Woods to all appearance growing on the ſame Soil, when one Oak of the ſame Age will contain double to another in Heart and Timber: And that in one the Heart will not be ſo big as a Man's Arm, when the Trunk exceeds a Man's Body. This ought to be well weighed in the firſt plantation of Copſes, and a *good Eye* may diſcern it in the firſt ſhoot; the difference proceeding from the variety of the *ſeed*; therefore let it be gather'd from the beſt ſort of Trees.

To tranſplant an *old Tree* was formerly eſteem'd a wild and difficult Enterprize; yet *Count Maurice* (Governor of *Brazil*) planted a Grove near his Paradiſe of *Friburg*, containing 600 *Coco Trees* of Eighty Years growth, and fifty foot high to the neareſt Bough: Theſe he waſted upon Floats and Engines, four long Miles, and planted them ſo ſucceſsfully, that they bare abundantly the very firſt Year; and *Monſieur de Fiat* (a Marſhal of *France*) hath with huge *Oaks* done the like at *Fiat.* Alſo a great Perſon in *Devon*, planted *Oaks* as big as twelve Oxen could draw, to ſupply ſome defect in an Avenue to his Houſe; and the Lord *Fitz-Harding* practis'd the removing of great *Oaks* in the following manner:

Chuſe a Tree as big as your *thigh*; remove the Earth from him; cut through all the collateral Roots, till with a competent ſtrength you can force him down upon one ſide, ſo as to come with your Axe at the tap-root; cut that off, re-dreſs your Tree, and ſo let it ſtand cover'd about with the mould you looſen'd from it, till the next Year, or longer if you think fit; then take it up at a fit ſeaſon; it will likely have drawn new tender Roots apt to take, and ſufficient for the Tree, whereſoever you ſhall tranſplant him. To facilitate the Removal of *large Trees*, for the adornment of ſome particular place, or the *rarity* of the Plant, there is this expedient: A little before the hardeſt Froſts, make a ſquare trench about your Tree at ſuch diſtance from the ſtem, as you judge ſufficient for the Root; dig this of competent depth, ſo as almoſt to undermine it, by placing Blocks and Quarters of Wood, to ſuſtain the Earth; this done, caſt in as much Water as may fill the trench, or at leaſt ſufficiently wet it, unleſs the Ground were very moiſt before: Thus let it ſtand, till ſome very hard Froſts do bind it firmly to the Roots, and then prepare it to the Pit, made for its new ſituation, which you may preſerve from Freezing by laying ſtore of warm Litter in it, and ſo cloſe the Mould the better to the ſtraggling Fibres, placing what you take out to your *new Gueſt*, to preſerve it in temper: But if the Mould about it be over heavy, you may raiſe it by a Crane, or Pully hanging between a Triangle, which is made of three ſtrong and tall Limbs united at the top, where a Pully is faſtned, as the Cables are to be under the Quarters, which bear the Earth about the Roots: For by this means you may weigh up, and place the weighty clod upon a trundle to be convey'd, and replanted where you pleaſe, being let down perpendicularly into the place by the aſſiſtance of the aforeſaid Engine.

And by this Addreſs you may tranſplant Trees of a *wonderful Stature* without the leaſt diſorder, and many times without topping or diminution of the Head; which is of great Importance, where this is practis'd to ſupply a *Defect*, or remove a *Curioſity*.

Trees of *ordinary* Stature tranſplanted (being firſt well water'd) muſt be ſufficiently ſtak'd and buſh'd, to protect them from the Violence of Wind, Rubbings of Cattle, or ſuch like; till being well grown and fixed (which may be in four Years) they ſhall be able to withſtand all accidental Invaſions but the Axe: For I am now come to their *Pruning* and *Cutting*, in which Work the *Seaſons* are of great conſequence.

Therefore from *Timber-Trees* cut off *no Heads*, nor be too buſy with *Lopping*; but for Shade, Fuel, or Maſt, lop off their Tops, and prune unthriving Branches only. If you intend an out-right Felling, expect till *November*; otherwiſe the Sap not being perfectly at reſt, the Worms will breed there: But for the Chimney you need not be ſo punctual.

The beſt time of *Felling* is juſt before they begin to decay; but ſuch as appear decaying are firſt to be cut down, and then thoſe that are approaching to it; but the plain thriving indulged till laſt. The beſt way to know the State of the Tree, is to bore with a middling Piercer, made *Auger*-faſhion, and to examine what Subſtance comes by the frequent pullings out. Some will pronounce ſhrewdly the State of a Tree, by digging a little about the Roots; and when the Tree periſhes at top, 'tis ever a mark of great decay in the *Roots*. There is alſo a *ſwelling* Vein, which diſcovers it ſelf eminently above the reſt of the Stem, altho' inveſted with Bark like the reſt, and which frequently circles about the Tree like *Ivy*, which is an infallible ſign of *Hollowneſs*. The common ſeaſon for this work is about the end of *April*, (when the Bark does commonly riſe freely.) Men greatly differ in this point: But without doubt, while the Trees are over moiſt they are not ſo fit for the Axe, for they are more obnoxious to Putrefaction and the Worm; wherefore 'tis adviſed before a Fall to make a gaſh to the Pith, that the whole Moiſture may diſtil; for the Veſſels that aſcend in the Bark are call'd the *Arteries*, and thoſe that deſcend in the Sap, I may rather ſay the Trunk, are the *Veins*. Some ſuperſtitious Perſons lay great ſtreſs upon the time of the Moon and Day, when Timber ſhould be fell'd; and not only ſo, but the Strength of the Wind, and the Corner from whence it cometh; which laſt indeed may be of ſome uſe, in conſideration of the place where it is deſign'd to lie; but otherwiſe the Woodman would make but ſmall riddance, and be like the Husbandman in the *Proverbs*, that minded the Winds, and therefore could neither *ſow* nor *reap*.

In order to *Felling* of Timber (in caſe of buying) Mr. *Evelyn* approves of *Markham*'s Advice, who ſays, " Survey your *Woods* as they " ſtand, immediately after *Chriſtmas*; and then divide the Species in a " Note-Book, and conſider for what purpoſes every kind is moſt uſe-" ful: After this reckon the *bad* and *good* together, that *one* may put " off the *other* without *gleaming* the beſt Timber. This done, learn " the marketable prices near-hand of the ſeveral ſorts; as what ſo many " Foot ſquare and long is worth for the ſeveral Employments; what " Planks and other Scantlings, &c. are fit for ſo many Spokes, Rings, " Pales, Poles, Spars, &c. As ſuppoſe it were Aſh, to ſet apart the " *largeſt* for the Wheelwright, the *ſmalleſt* for the Cooper, and that of " *ordinary* Scantling for the Ploughs, and the Bruſh to be kidded and

" ſold by the hundred. And ſo all other ſorts of Timber, *viz.* large, " middling Stuff, and Poles, *&c.* allowing the *Waſte* for the Charges " of Felling, *&c.* All which you ſhall compute with greater certain- " ty, if you girt it with a ſtring, and reduce it to the ſquare, *&c.* by " which you may give a near gueſs: Or you may mark ſuch as you in- " tend to fell; and then begin your ſale about *Candlemas*, till the Spring; " before which you muſt not lay the Axe to the Root; tho' for ſome " particular uſes, as for Ploughs, Carts, Axle-trees, Harrows, and the " like, it is common to cut in *October*; and indeed were it not for the " ſake of the Bark, every Oak ought to be cut down before *February.*

One of the firſt and moſt principal things with Workmen in *Felling* of Trees, is the skilful disbranching of the *Boal* of all ſuch *Arms* and *Limbs* as may endanger it in the Fall; and therefore in a very great Arm chop a *Nick* under it cloſe to the *Boal*, that ſo meeting with the down-right ſtrokes, it may be ſever'd without *ſplitting*. In Trees, what is call'd the Male is much *harder* than the Female. If you deſign a freſh one to grow from the Roots, fell your Tree as cloſe to the ground as poſſible; beſides, the longer the Stick of the Tree fell'd, the better it is for many uſes. Some will not cut a ſeedling Oak, ſo as to have any thing grow from its Root, becauſe they ſay it produces a *reddiſh* Wood not acceptable to the Workman; and that the Tree that grows on the Head of his Mother does ſeldom arrive to be good Timber. It is obſerv'd, that one foot of Timber near the Root (which is the proper Kerfe or Cutting-place) is worth three farther off: but let this be enquired into, and it ſeems to be of no great weight.

When your Tree lies on the ground, then ſtrip off the Bark, and ſet it ſo as it may dry beſt; then cleanſe the Boal of the Branches which were left, and ſaw it into lengths for ſquaring. And to make excellent Boards and Planks, ſome adviſe you ſhould *bark* your Trees in a fit ſeaſon, and ſo let them ſtand a Year before felling; which ſeems rational enough.

Before Timber is remov'd, the *Dew* ſhould be off. Lay up your Timber very dry, in an airy place, out of Wind or Sun, and laying along one piece upon another, interpoſing ſome ſhort blocks to preſerve them from mouldineſs, which they uſually contract while they ſweat; and which frequently produces a kind of *Fungus*, eſpecially if there be any *ſappy* parts remaining. Some Perſons ſubmerge their Timber in Water to hinder the cleaving, and this is good. Lay therefore your Boards a fortnight in the Water, and then ſetting them upright in the Sun and Wind, ſo as it may freely paſs through them, turn them daily; and thus treated, newly-ſawn Boards will floor better than by many years dry ſeaſoning. But to prevent all poſſible accidents, let the Joints for your Floors be ſhot, fitted, and *tack'd* down only for the firſt year, *nailing* them for good and all the next: for thus they will not in the leaſt *ſhrink*. But I take it, *Oak* is but little uſed for flooring of Houſes. Among Wheelwrights, the *Water-ſeaſoning* is of eſpecial regard. The *Venetians*, for their Arſenal Proviſion, lay their *Oak* ſome years firſt in Water. Some commend buryings in the Earth; and there are ſeaſonings of the Fire for hardening of Piles, which are to ſtand either in the *Water* or the *Earth*.

But notwithſtanding theſe Seaſonings, the greeneſt Timber is ſometimes deſirable for ſuch as carve and turn; but for *Doors*, *Windows*, *Floors*, and other *cloſe Works*, it is altogether to be rejected. Therefore

fore 'tis beſt to chuſe ſuch as is of two or three years ſeaſoning, and in the mean between moiſt and dry.

Timber which is *cleft* is not ſo obnoxious to rift and cleave, as what is *hewn*, nor *ſquar'd* as *round*. Large Columns bored through from end to end, is an excellent preſervative from ſplitting; tho' to cure this accident, rubbing with a Wax-cloath is good; or before it be converted, the ſmearing it over with Cow-dung, which prevents the effects both of Sun and Air, if it muſt be expoſed. The *Hollanders coat* their Timber that is expos'd to the Sun with a mixture of Pitch and Tar, on which they ſtrew powder'd *Cockle-ſhells* mix'd with Sea-ſand and Scales of Iron beaten ſmall, which *arms* them after an incredible manner. But the Timber muſt be well dry'd; and to prevent *Fire*, they rub them with a *Waſh* made of *Allom*.

The moſt *ponderous Timber* is beſt for all uſes, and what ſinks deepeſt in the Water is ſuch; alſo freedom from knots and ſap is a great excellence. Some affirm, that *old Oak*, *old Walnut*, and *young Aſh*, are beſt for moſt uſes; but in *Ship-building* it does not hold, for *old Timber* will be apt to be *brittle*. That Timber is eſteem'd beſt that grows moſt in the Sun, and on a dry and hale ground; for thoſe Trees which ſuck leaſt are hardeſt and longeſt liv'd: the Climate therefore contributes much to its quality, and the *Northern* ſituation is preferr'd, tho' there are *ſome* exceptions. The Wood under ground is thought to be worth almoſt as much as what is above; for tho' 'tis leſs, yet 'tis of more value for many purpoſes.

As to the *Felling* of Fuel-Wood, begin with the Under-wood, eſpecially *Oaks*, as ſoon as they will ſtrip, but not after *May*; and ſo fell as the Cattle may have the browſing; but fell no more in a day than they can eat; then kid or *bavin* them on the ends to preſerve them from rotting: Thus the Under-wood being gone, the reſt will proſper the better. If you head or top for the Fire, begin three or four foot above the Timber, if it be conſiderable; but if only ſhaken Trees and Hedge-rows, ſtrip them even to thirty foot high; and 'twere good to top ſuch as wither at the tops a competent way beneath, to prevent their ſickneſs downwards, which will elſe certainly enſue; whereas thus dying Trees may be preſerv'd, tho' they never advance taller. This is a profitable obſervation for ſuch as have old doating, or any ways infirm Woods. In other Fellings disbranch from bottom to top: and for cutting for Fuel, you may at the ſides cut a foot or more from the body; but never when you ſhred Timber-trees. 'Tis ill to cut Fire-Wood when the Sap is up, for 'twill never burn well. *Eaſt* and *North* Winds are reckon'd unkind to the ſucceeding Shoots.

Oaks from the firſt Semination are in ſome places ready to be cut for Coppice in *fourteen* years; and ſome Acorns ſet in hedge-rows have in thirty years Stems of above a foot diameter. Generally Coppice-wood ſhould be cut cloſe, and at ſuch intervals as the growth requires; which being ſeldom conſtant, depends much on the places and the kinds, the earth and the air, to direct us. Oak for Tanners Bark may be fell'd from *April* to the laſt of *June*, by a Statute of 1 *Jacobi*.

Nothing is more deceitful than *ſtanding* Trees; ſo various are their hidden Infirmities, till they be felled and ſawn out. A Timber-tree, whether of *Oak* or other *Wood*, is compar'd to a Merchant Adventurer; you ſhall never rightly know what he is worth till he is dead.

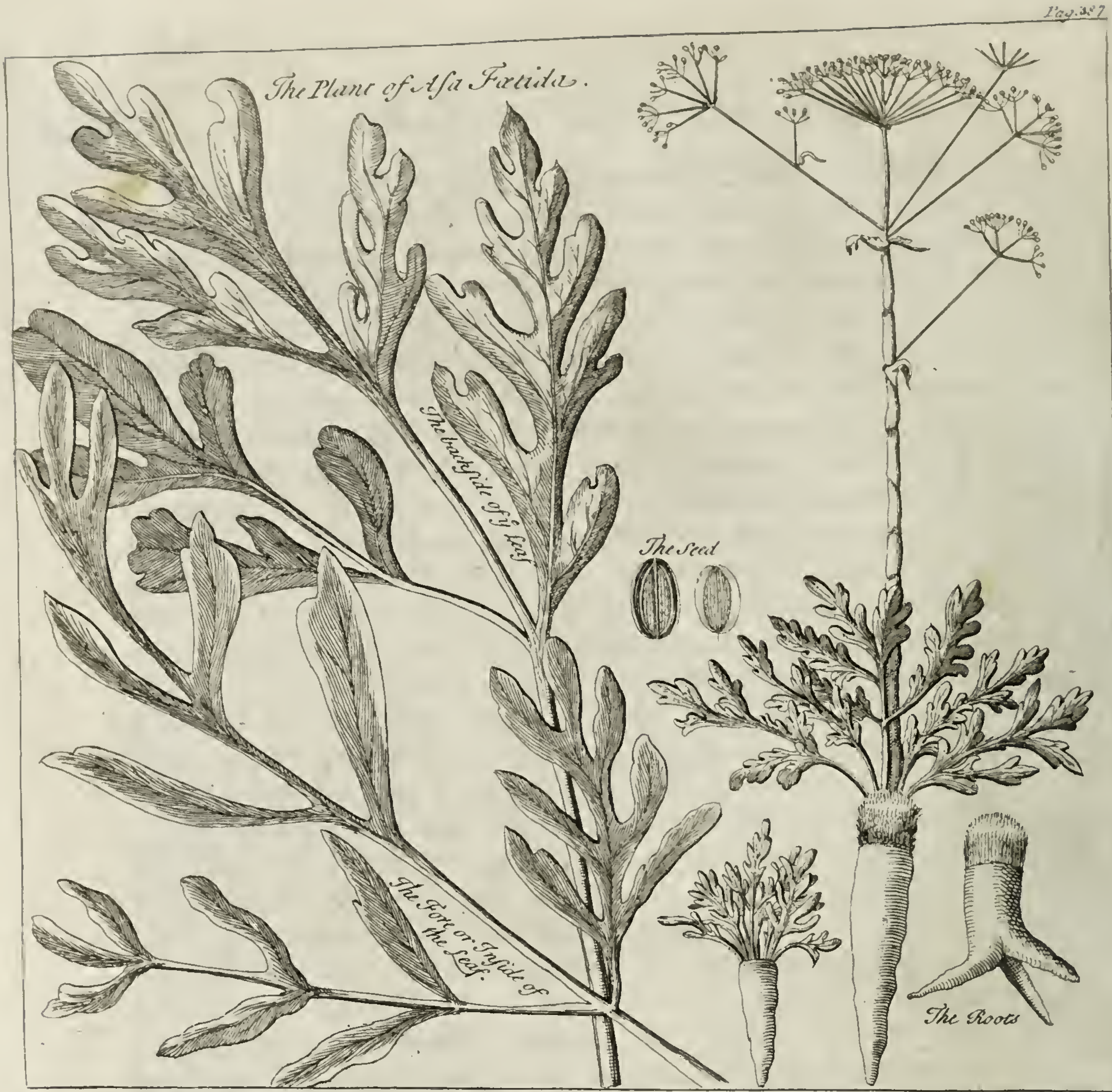
With Oak, *Houſes*, *Ships*, *Cities* and *Navies* are built; and ſome is ſo tough and extremely compact, that our ſharpeſt tools will hardly enter it, and ſcarcely the very fire it ſelf; in which it conſumes but ſlowly, as ſeeming to partake of a *ferruginous* and *metallin* ſhining nature, proper for ſundry *robuſt* uſes. It is doubtleſs, of all Timber hitherto known, the moſt univerſally uſeful and ſtrong: for tho' ſome Trees are harder, as *Box*, *Cornus*, *Ebony*, and divers of the *Indian Woods*, yet we find them more fragil, and not ſo well qualified to ſupport great Incumbencies and Weights; nor is any Timber more *laſting*, which way ſoever uſed. That which is *twined* and a little *wreathed* (eaſily to be diſcern'd by the texture of the Bark) is beſt to ſupport burthens; for Poſts, Columns, Summers, *&c.* for all which our *Engliſh Oak* is infinitely preferable to the *French*, generally ſpeaking. 'Tis found that the rough-grain'd body of a *ſtubbed Oak* is the fitteſt Timber for *Engines*, *Pales*, *Laths*, *Cooper's Ware*, *Clap-board* for Wainſcot, *&c.* and ſome *Pannels* are curiouſly vein'd. There is in *New England* a certain *Red Oak*, which being fell'd, they ſeaſon in ſome moiſt and muddy place, which branches into very curious works.

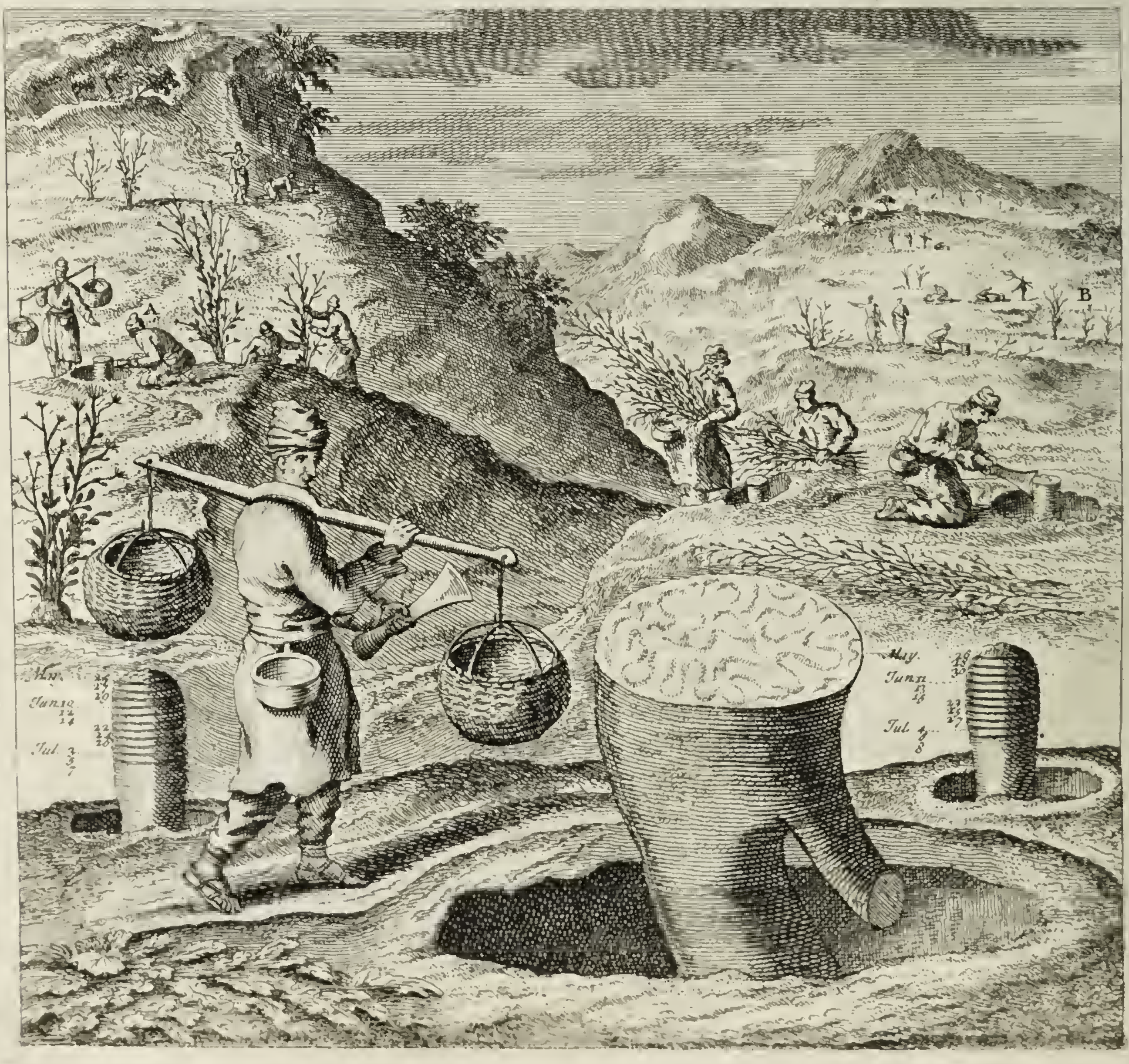
Oak is excellent for *Wheel-Spokes*, *Pins* and *Pegs* for tyling, *&c.* the Knottieſt for *Water-works*, *Piles*, and the like; the Crooked, and yet firm, for *Knee-Timber* in ſhipping, *Mill-Wheels*, *&c.* Of *Coppice-Oak*, *Hoops* are made much better than of *Hazel*; for they being of the youngeſt Shoots, are exceeding tough and ſtrong. One of them being of *Ground Oak* will out-laſt ſix of the beſt *Aſh*; the ſmaller Truncheons and Spray make *Billet*, *Bavin*, and *Coals*; and the *Bark* is of price with the Tanner and Dyer, to whom the very *Saw-duſt* is of uſe.

The *Ground-Oak*, while young, is uſed for *Poles*, *Cudgels* and *Walking-Staves*. Moſt Roots have ſome excellency for fair, beautiful, chamleted and laſting Timber, applicable to many purpoſes; ſuch as formerly made *Hafts* for *Daggers*, *Hangers*, *Knives*, *Handles* for *Staves*, *Cups*, *Tobacco-boxes*, and elegant *Joiner's Work*, and even for ſome *Mathematical Inſtruments* of the larger ſize, *&c.* Neither is to be omitted the *Galls*, *Miſletoe*, *Polypod*, *Agarick*, *Fungus's* to make Tinder; and many other uſeful Excellencies, to the number of above *twenty*, which diſcover the variety of Virtues of this *admirable Tree*.

Acorns are a good Feed for *Hogs*, and other Cattle. 'Tis ſaid, a Peck of *Acorns* a day with a little *Bran*, will make a Hog increaſe a pound weight a day for two months together. They give them alſo to *Oxen*, mingled with *Bran*, chopp'd or broken, otherwiſe they are apt to *ſprout*. Some adviſe to *macerate* them firſt in water to extract their Malignity, leſt the Cattle by a new food periſh. They are moſt proper for Swine, and being made ſmall will fatten Pidgeons, Peacocks, Turkeys, and other Poultry. Acorns were heretofore the food of *Men*; and in the time of the *Romans* the cuſtom was in *Spain* to make a ſecond Service of *Acorns* and *Maſts*, as the *French* now do of *Marrons* and *Cheſnuts*. And ſome Authors mention an *Oil of Acorns* chymically drawn, which they affirm to be of the longeſt continuance, and leaſt conſumptive of any Lamps and Lights.

Oaks alſo bear a *Knur* full of a cottony matter, of which they anciently made Wick for their Lamps and Candles. *Varro* affirms that *Salt* was made of *Oak*, which they ſometimes uſed for meat, but chiefly to ſprinkle among and fertilize their *Seed-Corn*; and without doubt 'twas


The Plant of Aſa Fœtida.
The backſide of y^e Leaf
The Seed
The Fore or Inſide of the Leaf.
The Roots


A
B
May. 24 27 20
Junio 12 14
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Jul. 3 5 7
May. 28 30
Junii 13 15
23 25 27
Jul. 4 6 8

better for their Corn and Meat, for ſuch may be made of our *Pot-Aſhes*. Of the *Galls* is made the grounds and baſis of *Inks*, and ſeveral *Dies*, eſpecially *ſadder Colours*. The white Moſs compoſes the choiceſt *Cyprus Powder*, which is eſteem'd good for the head. Young *red Oak Leaves* boil'd in Wine make an excellent Gargle for a ſore mouth; and almoſt every part of the *Oak* is a ſovereign Medicine againſt *Fluxes* in general.

The Water of *May*-Dew from *Oak Leaves* is of admirable effect in *Ruptures*; and the diſtill'd Water of *Acorns* is reckon'd good againſt the *Phthiſick*, *Stitch* in the Side, and heals inward *Ulcers*, breaks the *Stone*, and refrigerates *Inflamations*, being apply'd with Linnen dipp'd therein: And ſome affirm, that the *Acorns* eat faſting kill the *Worms*, provoke *Urine*, and break even the *Stone* it ſelf; to ſay nothing of the *Viſcus*'s, *Polypods*, and other Excreſcencies, of which innumerable Remedies are compos'd; ſome of which ſee under the Head of *Miſletoe*.

As we have had in all Ages, *Oaks* of prodigious ſtature and growth in many parts of *England*, I ſhall here take ſome notice of them. The Duke of *Norfolk*, in *Workſop* Park, had an Oak ſpreading almoſt 3000 Square Yards, under the Shade whereof near a thouſand Horſe might commodiouſly ſtand at once. Dr. *Plot*, in his Hiſtory of *Oxfordſhire*, mentions an *Oak*, near *Clifton*, ſpreading from Bough-end to Bough-end eighty one Foot, ſhading in Circumference 560 ſquare Yards of ground, under which 'twas computed 2420 Men might very well ſtand in ſhelter: And a bigger near the Gate of the Water-Walk at *Magdalen College*, whoſe Branches ſhot 16 Yards from the Stem: Likewiſe of another at *Ricat*, the Lord *Norrey*'s Park, under which 4374 Men cou'd ſufficiently ſtand. This was that *Robur Britannicum* ſo much celebrated by the Author of *Dodona*'s *Grove*.

In *Denington Park* near *Newbury* were three *Oaks* ſaid to be planted by *Jeofry Chaucer*; *one* was 50 Foot high before any Bough or Knot appear'd, and cut five foot ſquare at the *But-end*, all clear *Timber*: The *ſecond* held 40 foot excellent Timber, ſtrait as an Arrow in growth and grain, and cutting four foot at the ſtub, and near a Yard at the top; beſides a Fork of almoſt ten foot clear *Timber* above the *ſhaft*: This *Oak* was of a *kind* ſo excellent, that it cut a grain clear as any *Clap-board*. And the *third* call'd *Chaucer*'s *Oak*, was a very goodly Tree; and it's remarkable that theſe *Oaks* were not 300 Years old. This was a *gravelly Clay* Soil, moiſten'd with ſmall and frequent Springs.

At *Framingham* in *Suffolk* grew the *Oak* which furniſh'd the Main-maſt of the old *Royal Sovereign*, which was 99 foot long, 35 inches diameter: But this Tree was exceeded by the Oak which afforded the Beams that lay thwart her, the diameter whereof was four foot nine inches, which yielded four ſquare Beams of four and forty foot each. In *Sheffield* Lordſhip, near to *Rivelin*, ſtood an *Oak* which had 18 yards without Bough or Knot, and carried a yard and ſix inches ſquare at the ſame height or length; and not much bigger near the Root: And in *Sheffield Park* there was an *Oak* call'd the *Lady*'s *Oak*, that contain'd 42 Tun of Timber, which had Arms that held at leaſt four foot ſquare for ten yards in length; the Body ſix foot, of clear Timber. At *Firth*'s Farm there was an Oak valued at 80 *l*. In the upper end of *Rivelin* ſtood the *Lord*'s *Oak*, of twelve yards about: And in the ſame Park was a Tree, which when cut and laid flat upon a level ground, two Men on

Horſe-back could not ſee each other over it. At *Reedham* in *Norfolk* grew an Oak valu'd at 40*l.* the Timber, and 12 *l.* the Lop-Wood. In a Coppice of my Lord *Craven's* there was an Oak that yielded 19 Tun and a half of Timber, 23 Cord of Fire-wood, 2 Load of Bark. Sir *Edward Harley* tells us, in a Park of his he had an Oak the Trunk whereof did compleatly ſeat with Wanſcot Pews a whole Church; and that he had ſeveral other Trees of the ſame ſtature: But his Trees were but chips in compariſon of a Tree in the Neighbourhood, in which every foot forward one with another, was half a Tun of Timber; it bore five foot ſquare, and forty foot long, *&c.* and the Boughs afforded twenty five Cord of Fuel Wood. This Gentleman declar'd in a Letter to Sir *Robert Morray*, that he was aſſur'd by an inquiſition taken about three hundred years from that time, that his Park and ſome adjacent Woods had not then a Tree capable to bear *Acorns*; yet that Park he had ſeen full of great *Oaks*, and moſt of them in the extremeſt wane of decay.

This ſeems to determine the age of Trees, according to the common obſervation, that an Oak is one hundred years a growing, one hundred years at a ſtand, and another hundred in its decay.

The Miſletoe.

THIS Plant uſually growing upon ſome or other kind of the Forreſt Trees, well deſerves a place amongſt them: And both for its extraordinary virtues, and for its uncommon way of propagation highly merits a very particular Deſcription. *Pliny* in his natural Hiſtory is very full in treating of this curious Super-plant; but our modern Obſervations about the manner of its growth and propagation, and its uſe in Phyſick, ſo far ſurpaſſing every thing that was ſaid of it by the Antients, I ſhall content my ſelf to obſerve, that the great Veneration and Eſteem which the *Druids*, formerly Prieſts and Philoſophers of this Iſland, acquired to themſelves, proceeded from the almoſt miraculous Cures which they performed by means of the *Miſletoe* of the Oak, which was in a peculiar manner held *Sacred* with them. However, I think our ingenious Countryman Sir *J. Colbatch*, in his ſhort Treatiſe of the admirable Virtues of this Plant, hath given right and ſtrong reaſons, that the difference of Trees doth little or nothing alter the nature of the Plant. And therefore concludes that there are the ſame Virtues to be found in the *Miſletoe*, upon what Tree ſoever it grows: And the general method of its Propagation he hath found to be this.

" There is a Bird generally known by the Name of the Miſletoe
" Thruſh; which name I ſuppoſe it derives from its feeding upon Mi-
" ſletoe Berries during the Winter Seaſon: From the Pulp of the Berries
" it is nouriſhed, but the Seeds are diſcharged with the excrement un-
" digeſted. Now the excrement being of a ſlimy nature, ſticks faſt to
" the Branches of the Trees, upon which it alls, and if there be any
" Crack in the Bark, there the Seed lodges it ſelf, and produces a Plant
" the next Year: The excrement being of the nature of Birdlime, and
" Birdlime, as it ſaid, being to be made of the Berries of this Plant, gave

" riſe I ſuppoſe to that very old Saying, that [a] *Turdus cacat ſui Excidium.*

How this Plant thrives in hotter Climates, and whether it will be perſwaded to grow upon Ever-greens like it ſelf, I have never yet learnt; but the artificial way of propagating it, where you have a mind, is to open the Bark of the Tree with a knife, and therein to *ſtick* the Seed in the Winter-ſeaſon when it is ripe. But it ſhould regularly be placed on the upper part of a Branch running horizontally, that it may be ſupply'd with Dews and Rain for its nouriſhment and growth. Mr. *Bradley* obſerves, that the manner of making its firſt Roots from the Seed, is by ſending out from its Center three Claws, which fix themſelves on the bark of the Tree in three points of a Triangle, and are at their extremities like the mouths of Leaches, whereby they draw their nouriſhment.

After it is become a Plant of ſome bigneſs it proceeds to bloſſom and bear Fruit, and will live to a great Age. There have been ſeveral Experiments try'd to make it grow in the Ground or prepared Earth; but I could never hear of any that have ſucceeded, even with the utmoſt Care. Some have imagined that it much weakens the Tree on which it grows, becauſe it commonly is found on old Trees; but there cannot be much in that. Old Trees rather than Young ones being more ſubject to cracks and accidents, which give Life to the Seeds there ſcattered. And it is very much to be queſtioned whether the *Miſletoe* receives its full nouriſhment from the Juice of the Tree; becauſe tho' it is indeed alive in the Summer time, when the Sap moſt freely circulates, yet it is then *but alive*, and doth not begin to flouriſh, till the Sap abates of its Vigor and Activity, and the Leaves of the Tree begin to drop. Inſomuch that the Berries of this extraordinary Plant are not full ripe till the latter end of *December*; and which is more extraordinary ſtill, it is obſervable that the Rigor and Severity of the Winter adds much to the vigor and verdure of the *Miſletoe*. All which conſidered, makes it highly probable, that it derives its principal ſupport and nouriſhment from the vegetable particles floating in the Air. This might be proved by an eaſy experiment of circumciſing the whole Bark of the Branch on which it grows, two or three Inches wide below, ſo as to hinder any Communication of Sap that way.

The ingenious Sir *J. Colbatch* hath recommended the Virtues of this wonderful Plant to the World with great force and ſpirit, to be uſed chiefly in all Epileptick Caſes. His Hiſtory of Cures performed thereby are indeed ſurprizing: But there is a good deal of care to be taken in preparing its Powder. His method is, at the latter end of *December* to gather the Leaves, Berries, and tender Twigs, drying them all together over a Baker's Oven, where there was a conſtant gentle Heat. After that, he had it made into very fine Powder to be put into a Glaſs covered with a Bladder, and kept in a very dry place. The larger ſtalks alſo he kept dry'd for decoctions and infuſions. He tells us of a diſtreſſed Youth of twelve years of Age, who for five years had laboured under violent convulſive Fits, without hopes of Remedy. He gave him only half a dram of the Powder made into a Bolus with Syrup of Peoneys every ſix hours, and after it a large draught of a ſtrong infuſion of the Stalks bruiſed and ſweetned with Syrup of Peoneys, and it ſucceeded ſo well, that he had not one Fit from the time he began to take this glorious Medicine, for a Month or more; and never one Cataleptick Fit to the day of his Death. In ſhort, it is now generally accounted one of the beſt Specificks in all Epileptick Caſes, and is ſo much better in its kind than the Jeſuits Bark, that, contrary to the nature of that, the more of it is taken, ſo much the better.

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[a] It is more than probable, that this was what *Theophraſtus*, in his Hiſtory of Plants, had in his Eye, when he relates, that a Bird, having let fall a Grain of Seed, which it could not digeſt, into the Cleft of a Branch, the Subſtance mix'd and incorporated ſo with the Tree, that it grew, and gave the firſt hint and occaſion to *Grafting*.

Aſh Tree.

THE *Aſh* is a Tree which bears its ſeeds in ſingle teguments, and theſe ſeeds are contained in membraceous coverings, or ſeed-veſſels, it hath *winged* Leaves, a *ſmooth* Bark, and *tough* a Wood.

The *Aſh* is with us reputed *Male* and *Female*, for that the *one* bears Keys, the *other* never any; the one affecting the *higher grounds*; the other the *Plains*, of a whiter Wood, and riſing many times to a prodigious ſtature: So as in forty years from the *Key*, an *Aſh* hath been ſold for thirty pounds *ſterling*: And 'tis credibly reported that one planted ſo many *Aſhes* as in his own Life-time were juſtly valu'd at *Fifty thouſand pounds*.

The Keys being gathered from a young thriving Tree, when they begin to fall (which is about the end of *October*) are to be laid in a place to dry, and then ſowed any time betwixt that and *Chriſtmas*, but not altogether ſo deep as *Beech Maſts*: They will lye a full year in the ground before they appear; and becauſe you muſt carefully fence them all that time, therefore if you would make a conſiderable Wood of them at once, dig or plough a parcel of Ground, as you would prepare it for Corn; and with the Corn, eſpecially Oats, ſow alſo good ſtore of Keys; take off the Crop of Corn, or ſeed in its Seaſon, and the next year following 'twill be covered with young Aſhes, which will be fit either to ſtand (which is beſt) or be tranſplanted for divers years after: And theſe will be far better than thoſe from Woods, (eſpecially *Suckers*, which are worth nothing) being remov'd at one foot ſtature, the ſooner the better, and well defended from Cattle. The reaſon of this haſty tranſplanting, is to prevent their obſtinate and deep rooting, which makes them hard to be taken up when they grow older; and being remov'd they take no great hold till the ſecond year, after which they come away amain: Yet ſome of five and ſix Inches diameter have thriven as well as the ſmaller Trees. You may accelerate their ſpringing by laying the Keys in Sand, and ſome moiſt fine Earth, or a row of Earth and a row of Keys; but lay them not *too thick*, nor *double*; and in a cover'd, tho' airy place, for a Winter before you ſow them; and the ſecond year they will come away greatly, ſo as you trim and cleanſe them. Cut not their *heads* at all, nor by any means the *fibrous part* of the Root; only the downright, or tap-root, is to be *totally* abated: And this ought to be in the Months of *October*, or *November*, and not in the *Spring*.

'Tis better to ſpare the *Head* than the *Side-Branches* of the *Aſh*, (which while young may be cut cloſe) becauſe, being yet tender, it is but pithy, and of a ſpungy ſubſtance; but being once well fixed, you may cut him as cloſe to the Earth as you pleaſe; it will cauſe him to ſhoot prodigiouſly, ſo as in a few Years to be fit for *Pike-ſtaves*; whereas, if you take him *wild* out of the *Foreſt*, you muſt of neceſſity ſtrike off the *Head*, which much impairs it.

Young *Aſhes* are ſometimes in Winter *Froſt-burnt*, black as Coals; in which caſe it is beſt to cut them down to the very bottom: For from the low Cuttings come out *Ground-Aſhes*, ſo much ſought after for *Arbours*, *Eſpaliers*, and other *Pole-works*: They will ſpring in abundance, and may be reduced to *one* for a Standard-Tree, or Timber. *Aſh* will be propagated from a Bough ſlipp'd off with ſome of the old Wood, a little before the Bud ſwells, but with difficulty by Layers. Such as they reſerve for Spears in *Spain*, they keep ſtript up cloſe to the Stem, and plant them in cloſe order, and moiſter places; theſe they cut above the Knot in *January*, which is rather of the lateſt.

'Tis ill to plant *Aſh* in Plow-Lands, kept in Tillage; for the Roots will be obnoxious to the Coulter, and the Branches dripping upon Corn ſpoils it: But in Hedge-rows and Plumps they will thrive exceedingly, and without doing injury, where they may be diſpos'd at nine or ten Foot diſtance, and ſometimes nearer. But in planting a whole *Wood* of ſeveral kinds of Trees for Timber, every *Third* at leaſt ſhould be an *Aſh*. Some ſay, (but it is not very material) that the *Aſh* will receive a Graff of its own kind; or be inoculated with the *Pear* and *Apple*. The beſt Aſh delights in the beſt Land, (which it will ſoon *impoveriſh*) yet grows in any; ſo as it be not over ſtiff, wet, and approaching to the *marſhy*, unleſs it be firſt well drained: By the Banks of cryſtal Streams they thrive infinitely. There is as much *difference* in the Timber of the *Aſh* as the *Oak*; much more than is found in any one kind of *Elm*. The Ground-*Aſh* (like the *Oak*) much excels a Bough of the ſame bulk of *Elm* for ſtrength and toughneſs: And in farther emulation of the *Oak*, it has been known in ſome places to prove as good and laſting Timber for Building, nay, preferr'd before it, where there has been plenty of *Oak*: vaſt difference there is alſo in the ſtrength of *Ground* and *Quarter'd-Aſh*. 'Tis likewiſe remarkable, that the *Aſh* grows when the Bark is as it were peeled off. Some *Aſh* is curiouſly *camleted* and vein'd ſo differently from other Timber, that 'tis priz'd equal with *Ebony*, and has the Name of *Green Ebony*.

The uſe of *Aſh* is (next to that of the *Oak* itſelf) one of the moſt *univerſal*: It ſerves the Soldier for *Spears*, the Carpenter, Wheelwright, Cartwright for *Ploughs*, *Axle-Trees*, *Harrows*, &c. and makes the beſt *Oars*, and *Blocks* for Pulleys and *Sheffs*, as Seamen name them: It alſo ſerves the Cooper, Turner, and Thatcher; and nothing is like it for Garden *Paliſade-Hedges*, *Hop-yards*, *Poles*, *Spars* and *Handles*, *Stocks* for Tools, *Spade Trees*, &c. The *Aſh* is uſeful from the *Pike* to the *Plough*. There is extracted an *Oil* from the *Aſh*, by the proceſſion of other Woods, which is excellent to recover the *Hearing*, ſome drops of it being diſtilled warm into the Ears; and for the *Caries* or *Rot* of the Bones, Tooth-ach, pains in the Kidneys and Spleen, the anointing therewith is moſt ſovereign. The *Chymiſts* commend the Seed of *Aſh* as an admirable remedy for the *Stone*. The dead

Leaves of *Aſh* afford (like thoſe of the *Elm*) relief to our Cattle in Winter; and there is a *Dwarf* ſort in *France*, whoſe *Berries* feed the poor People in ſcarce Years: but it bears no Keys like to ours, which being pickled, afford a delicate ſallading. But the ſhade of the *Aſh* ſhelters a noxious Inſect; and for their leaſing ſo late, and falling ſo ſoon, they are not to be planted either for *Umbrage* or *Ornament*, eſpecially near the Garden, becauſe the Roots are prejudicial, and the long-leav'd Stalks are drawn by cluſters into the Worm-holes, and ſo foul the Allies with their Keys. The Truncheons of this Wood make the third ſort of moſt durable *Coal*, and is the ſweeteſt of our Foreſt fuelling, being fitteſt for Ladies Chambers: It will burn even when green, and the Sap is yet in it.

The *Seaſon* for felling of this Tree, is when the *Sap* is fully at reſt; for if it be cut down *too early* or *late*, it will be ſo obnoxious to the *Worm*, as greatly to prejudice the Timber; therefore be ſure not to fell till the three Mid-winter Months, beginning about *November*. But in lopping of *Pollards* (as of ſoft Wood) it is beſt to ſtay till towards the Spring, and that the Lops grow not too great. As ſoon as a *Pollard* comes to be conſiderably hollow at the Head, cut it down, for otherwiſe the Body will decay more than the Head is worth. The ſame is to be done with taller Aſhes, where the Woodpeckers make holes, which conſtantly indicates their being faulty or rotten.

As to the further virtues of the *Aſh*, it may be obſerved, that the juice thereof is much recommended as a ſovereign remedy againſt poiſon, and the ſting of Serpents. *Pliny* ſpeaks of this Tree as of a wonderful vulnerary; and aſſures us, that in all Nature there is no ſpecific for healing of wounds and againſt poiſon that can be compared to the juice of the young Shoots and Leaves of Aſh. According to his own experience he gives this deſcription of it. The juice of Aſh (ſaith he) is a powerful remedy againſt the biting of Serpents, for to drink of it will perform the cure. Apply ſome Leaves of this Tree to a wound and it will heal. I know not any remedy ſo ſpeedy and certain; and I believe there is nothing in the world ſo good and ſafe. The Aſh is ſo powerful a remedy againſt Serpents, that neither in the Evening nor Morning, when the ſhade of the Tree ſtretches furtheſt, no Serpent whatſoever will dare to paſs under it. And I know by my own experience, that a Serpent encloſed with Aſh-Leaves, and a Fire throughly kindled, will throw himſelf rather into the flames, than croſs over the Leaves [b].

But indeed, ſince the days of *Pliny*, many other virtues have been diſcovered in the Aſh; and among the wonderful things ſaid of it, if but one half of them were true, we ſhould find in this ſingle Tree almoſt an entire Diſpenſatory; and the Leaves, the Wood, and the Juice of the Aſh, would be ſufficient to furniſh an Apothecary's Shop. *Schottus* [c] has collected no leſs than thirty ſeven virtues, which the *Germans* aſcribe to the ſeveral parts of this Tree. To which I refer the curious.

But after all; I cannot but wonder with Mr. *Evelyn*, at the univerſal confidence of our Botaniſts, who are apt to take things upon truſt from one another, eſpecially if they can ſupport a Paradox by the authority of ſo great a Man as *Pliny*: How they can aſſert a thing ſo improbable and ſo contrary to truth, as the Serpent avoiding an Aſh-bough, and chuſing the fire. *Pliny* himſelf, I doubt, *gave into* many things only on hearſay and report; and his Followers have done very ill to ſpread many of his miſtakes.

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[b] *Contra Serpentes verò Succo expreſſo ad potum, & impoſita Ulceribus, opifera ac nihil æquè reperiuntur Fraxini folia: Tantaq; eſt vis, ut ne matutinas quidem occidenteſve Umbras, quæ ſunt longiſſimæ Serpens arboris ejus attingat, adeò ipſam procul fugiat. Experti prodimus, ſi fronde ea gyro claudatur Ignis & Serpens, in Ignem potius quam in Fraxinum fugere Serpentem.* Hiſt. Nat. Lib. xvi. Cap. 13.

[c] *Schottus Joc. Ser. Nat. & Art. Cent.* 3. *Propos.* Pag. 299.

Elm Tree.

THE Elm is a Tree bearing its *Seeds* in ſingle Teguments or Coverings, that are *membranaceous*, with *falcaceous* Husks, whoſe Leaves are *rough* and *indented*, and having a *rugged* Bark.

Of theſe Trees, Mr. *Evelyn* ſays there are four or five ſorts; but we reckon *two* or *three* only are moſt worthy of our culture: The vulgar *Engliſh*, or Mountain Elm, being of a leſs jagged and ſmaller Leaf; and the *Dutch* or *French Elm*, whoſe Leaves are thicker and more florid, delighting in the lower and moiſter grounds, where they will ſometimes riſe to above an hundred foot in height, and a prodigious growth in leſs than an Age; there is alſo the Witch Elm.

It has been generally thought that the Elm has no Seed, but experience ſhews the contrary; and though all of theſe are commonly rais'd of Suckers, yet they grow and come well from the Seeds, which are ripe about the beginning of *March*, or the following Month. To raiſe them of their Seeds, being well dry'd a day or two before, and ſprinkled in beds prepared of good loamy freſh Earth; ſift ſome of the fineſt mould thinly over them, and water them when need requires: Being riſen (which may be within four or five Months) an Inch above ground, refreſh'd and preſerv'd from the ſcraping of Birds and Poultry, comfort the tender Seedlings by a ſecond ſifting of more fine Earth to *eſtabliſh* them; thus keep them clean weeded for the firſt two Years, and cleanſing the ſide-boughs; or 'till being arriv'd of fitting ſtature to remove into a Nurſery at wider Intervals, and even Rows; you may thin and tranſplant them in the ſame manner as you do young *Oaks*; only they ſhall not need above one cutting, where they grow leſs regular and hopeful. But becauſe all this is ſomething troubleſome, 'tis adviſed that Suckers ſhould rather be planted about the end of *October*, when they will grow very well.

Even Stakes of Elm ſharpen'd at the ends for other purpoſes, take root familiarly in moſt Grounds, and become Trees. Truncheons of the Boughs and Arms, about a Yard or Ell long, chopt on each ſide oppoſite, and laid into Trenches half a foot deep, and covered about two or three Fingers with good mould, increaſe abundantly. The ſeaſon for this work is about the end of *January*, or early in *February*, if the froſts hinder not; and after the firſt year you may cut or ſaw the Truncheons off in as many places as you pleaſe, and as the Shoots and rooted Sprouts will direct you, for Tranſplantation.

Beſides theſe ways for propagating *Elms*, let trenches be ſunk twenty or thirty yards from ſuch Trees as ſtand in Hedge-rows, and in ſuch order as you deſire your Elms ſhould grow; where theſe trenches are, many young Elms will ſpring from the ſmall Roots of the adjoining Trees: Divide after one year the ſhoots from their *Mother-Roots* with a ſharp a ſharp Spade; theſe tranſplanted will prove good Trees, without damage to their *Progenitors*. Or lop a young *Elm*, the Lop being about three Years growth; do it in the latter end of *March*, when the Sap begins to creep up into the Boughs, and the Buds are ready to break, into lengths of four foot ſlanting, leaving the Knot where the Bud ſeems to put forth in the middle: Inter theſe in trenches of three or four inches deep, and in good mould well trodden, and they will infallibly produce you a Crop, for even the ſmalleſt Suckers of *Elms* will grow (being ſet) when the Sap is newly ſtirring in them.

There is yet a *fourth way* no leſs expeditious: Bare ſome of the Maſter Roots of a vigorous Tree within a foot of the Trunk, and with your Axe make ſeveral Chops, putting a ſmall Stone into every Cleft, to hinder their cloſure, and give acceſs to the wet; then cover them three or four inches thick with Earth; and thus Mr. *Evelyn* aſſures, that one ſingle Elm well order'd will make a fair Nurſery, which after two or three Years, you may ſeparate and plant in the place deſign'd for them; and which, if it be in clumps, within ten or twelve foot of each other, or in Hedge-rows, it will be the better: For the *Elm* is a Tree of *Conſort*, *Sociable*, and ſo affecting to grow in Company, that the very beſt do almoſt touch one another; this alſo protects them from the Winds, and cauſes them to ſhoot of an extraordinary height, ſo as in a little more than forty years they arrive to a *Load* of Timber, provided they be carefully cultivated, and the Soil propitious. An *Elm* does not thrive ſo well in the *Foreſt*, as where it may enjoy ſcope for the Roots to dilate and ſpread at the ſides, as in *Hedge-rows* and *Avenues*, where they have the Air likewiſe free. They do very properly by Layers alſo.

Of all the Trees in our Woods, none better ſuffers a tranſplantation than the Elm; for you may remove a Tree of twenty years growth with undoubted ſucceſs. My Author has tranſplanted an *Elm* as big as his Waſte; but it was *disbranch'd* all but the *ſummit*, which was *entire*, and he took him up with as much Earth as he could, and refreſh'd him with abundance of *Water*: This is an excellent and expeditious way for great *Perſons* to plant the *Acceſſes* of their Houſes with; for being diſpos'd at ſixteen or eighteen foot interval, they will in a few years bear goodly heads, and thrive to admiration. Some emplaiſter the wounded head of ſuch over-grown *Elms*, with a mixture of *Clay* and *Horſe-Dung*, bound about with a Wiſp of *Hay* or fine *Moſs*, which may do well if temper'd ſo as the vermin neſtle not in it. For more ordinary plantations (not *Viſtas*'s and *Avenues*) younger Trees which have their Bark ſmooth and tender, clear of Wens, about the ſcantling of your Leg, and their heads trimm'd at five or ſix foot height, are to be preferr'd before all others; but experience tells us we can hardly plant an Elm too big, provided you lop his head in a due proportion to what hath been taken from the Roots.

There is no Tree whatſoever becomes *Walks* and *Avenues* comparably to this *Majeſtick* Plant. At the *Eſcurial*, belonging to the King of *Spain*, are planted, for Leagues together, theſe Trees; and ſome of them, forty yards high, are kept ſtript almoſt up to the very top Branch, which renders a moſt glorious and agreeable ſight. And the *Elm* is, by reaſon of its aſpiring nature (unleſs it be topp'd to enlarge the Branches and make it ſpread) the leaſt offenſive to *Corn* and *Paſture Grounds*, to both which, and the Cattle that feed therein, they afford a kind ſhade and defence, and are at the ſame time an agreeable ornament.

The *Elm* delights in a *ſound*, *ſweet* and *fertile* Land, ſomething more inclined to *Loamy* Moiſture, where good Paſture is produc'd; tho' it will proſper in the gravelly Land, provided there be a competent depth of Mould, and it be refreſh'd with Springs; in defect of which, being planted on the very ſurface of the Ground (the ſwarth par'd firſt away, and the Earth ſtirred a foot deep or more) they will undoubtedly ſucceed; but in this Tryal, let the Roots be handſomely *ſpread*, and cover'd a foot or more in height, and above all *firmly ſtak'd*. This is practicable alſo for other Trees, where the Soil is over-moiſt, or unkind: For as the *Elm* does not thrive in too dry, ſandy, or hot ground, no more will it abide the cold and ſpungy; but in places that are competently fertile, or a little elevated from theſe *Annoyances*, as we ſee in the mounds and caſting up of Ditches, the *Female ſort* upon the Banks thereof does naturally delight.

It ſhould be planted as *ſhallow* as may be; for (as I am willing often to repeat it) deep interring of Roots is a *great miſtake*. And new planted Elms are to be kept moiſt, by frequent refreſhings, upon ſome half-rotten Fern and Litter laid about the foot of the Stem, the Earth being a little ſtirr'd and depreſs'd for the better reception and retention of the Water. The Plantations muſt be carefully preſerv'd from *Cattle*, and the *concuſſions* of impetuous Winds, till they are out of the reach of the *one*, and ſturdy enough to *encounter* the *other*. When you lop the *ſide-Boughs* of an *Elm*, be careful to indulge the *Tops*; for they protect the Body of your Trees from the Wet, which always invades thoſe parts firſt, and will in time occaſion them to *periſh* to the very *Heart*: This *Lopping* may be done about *January* for the Fire; and more frequently, if you deſire to have them *tall*, or that you would form them into Hedges; for ſo they may be kept plaſh'd, and thicken'd to the higheſt twigs, affording a moſt *magnificent* and *noble* defence againſt the Winds and Sun.

When you would fell this Tree let the Sap be perfectly in repoſe; as it is commonly about *November* or *December*, after the Froſt has well nipp'd them. And I am told, that both *Oak* and *Elm* ſo cut, the very Saplings will continue as long as the Heart of the Tree, for ſome uſes, without decay. In this work, cut your Kerfe near to the Ground, but have a care that it ſuffer not in the fall, and be ruin'd with its own *Weight*: This indeed is a neceſſary Caution in the felling of all other Timber-Trees. If any begin to *doat*, pick out ſuch for the *Axe*, and rather truſt to its *Succeſſor*.

Elms have been grafted, ſome think, to a great Improvement of their Heads. *Virgil* tells us they will join in Marriage with the Oak, eſpecially if you graft under the Earth, upon or near the Root it ſelf, which is likely to entertain the Cyon better than when more expos'd, till it be well fix'd, and have made ſome conſiderable Progreſs. A fair advance for ſpeedy growth, and noble Trees, may be aſſuredly expected from the grafting of young Elms with the beſt of their kinds; and where the goodlieſt of theſe are growing, the Ground would be plough'd and finely raked in the ſeaſon when the Scales fall; that the ſhowers and dews faſtning the Seed when the Wind drives it, it may take Root, and haſten (as it will) to a ſudden Tree: And if ſuch were planted near to one another, it is almoſt incredible what a Paleing they would be to our moſt expos'd Plantations, mounting up their wooden Walls to the Clouds.

When *Quickſet* is planted, Mr. *Evelyn* adviſes to plant an *Elm* every twenty or thirty foot; and if in planting Elms at competent ſpaces, and in Rows, you open a Ring of Ground at about four foot diſtance from the Stem, and prick in *Quick-ſet Plants*, you may after a while keep them clipp'd at what height you pleaſe; and ſo preſerve them from outward Annoyances. Elms are apt to be hollow, which is commonly caus'd by ignorant or careleſs Lopping, whereby the wet falls perpendicularly upon a part, eſpecially the Head: In this caſe if there be ſufficient ſound Wood, cut it to the *quick*, and cloſe to the Body, and cap the hollow part with a *tarpaulin*, or fill it with good ſtiff *Loam*, *Horſe-Dung*, and *fine Hay*, mingled: Old broken Boughs, if very great, are to be cut off at ſome diſtance from the Body; but the ſmaller, cloſe. The *Oak* will ſuffer it ſelf to be made a Pollard, that is, to have its Head quite cut off; but the Elm ſo treated will periſh to the foot, and certainly become hollow at laſt, if it eſcape with Life.

It may not be amiſs to inform the Curious here, that if the Elm is deſired to grow tall and ſtrait without any ſmaller Branches out of its Body or Stem, the cutting off ſuch Branches at *Midſummer* effectually anſwers that purpoſe; for after that you will ſee no more of them.

In the Mannor of *Norton*, in the Pariſh of *Ebbiſham* in *Surrey*, there were not long ſince *Elms* in good numbers, which did bear almoſt three foot ſquare for more than forty foot in height: They grew in a moiſt *Gravel*, and in the Hedge-rows. Dr. *Plot*, in his Natural Hiſtory, tells us of an *Elm* in *Oxfordſhire*, at leaſt ſix yards Diameter near the Ground: And alſo of a *Wich-Elm*, that was ſo very great and tall, that two able Workmen were five days in felling it; that it fell forty yards in Length, was at the Butt-end ſeventeen yards in Circumference, eight yards and a half about by girth Meaſure in the middle, and contain'd about ninety ſix (if not one hundred) Tun of Timber; beſides *Lop* and *Top*, which made above threeſcore Loads of Fire-wood: This Tree grew at *Field* in *Staffordſhire*; and the Account of it is well atteſted by Sir *Harvey Bagot* and others.

As to the Uſes of *Elm*, for *Pumps* and *Water-Pipes*, I find none like it: It is a Timber in moſt ſingular uſe, eſpecially where it may lye continually *dry or wet*, in *extreams*; therefore it is proper for *Water-works*, *Mills*, *Pumps*, *Aquæducts*, *Pales*, *Ship-planks* beneath the Water-line, &c. Some *Elm* that has been found buried in Bogs has *turn'd* like the moſt poliſh'd and hardeſt Ebony; only diſcern'd by the grain: For the Wheel-wright, *Chopping-blocks*, Blocks for the Hat-maker, *Trunks* and *Boxes*, to be cover'd with Leather, this Wood is of uſe; alſo for *Coffins*, *Dreſſers*, *Tables* of great length, for the *Carvers Work*, and moſt of the ornaments appertaining to the Orders of *Architecture*. And beſides theſe and many other uſes, this Wood makes the ſecond ſort of *Charcoal*.

The Leaves of this Tree, eſpecially of the *Female*, being dryed in the Sun upon the Branches, and the Spray ſtripp'd off in *Auguſt*, are a great relief to Cattle in the Winter, and in ſcorching Summers, when Hay and Fodder are dear; they will eat them before *Oats*, and thrive exceedingly well with them. In ſome parts of *Herefordſhire* they gather them in Sacks for their Swine, and other Cattle. The green Leaf of the *Elm* contuſed, heals a green *Wound* or *Cut*; and boil'd with the *Bark*, conſolidates fractur'd *Bones*: All parts of this Tree are abſterſive; and therefore ſovereign for conſolidating Wounds, and to aſſuage the pains of the *Gout*.

A Decoction of the inward Bark has been much uſed in *Gargariſms*, or *Mouth-waters*: And a Decoction of it may be alſo made an admirable *diuretic* Medicine.

Mr. *Switzer* obſerves, that he always look'd upon what *Salmaſius* had ſaid concerning raiſing *Elms* of *Chips*, to be but a *fabulous* Story; till upon buying a great many in *Oxfordſhire* for the Plantations at *Blenheim*, it was confirmed in ſeveral places; and one eſpecially, where there was a very fine Nurſery of *Elms* about five or ſix Inches Diameter, where the Perſon who was the Owner of them aſſured him, that within thirty years before there was not one *Elm*, nor any thing like it near them; but that upon hewing a great many *Elm Trees* for building a Barn, they were perceived the next Year to ſpring up; and taking care to preſerve them from the Cattle, they had come to that ſtature he ſaw them in. Rightly enough ſuppoſing, that it might probably be from thoſe Knots which grow thick on Elms, rather than the common Chips; or indeed rather from ſome of the green tender Branches trod in, or accidentally covered in the Ground.

This is one of the Trees chiefly to be recommended for Avenues leading to the Houſe: The Walk ſixty foot broad, and the Trees to be ſet forty aſunder.

Beech Tree.

THE *Beech* is a nuciferous *European* Tree, containing in one common Husk ſeveral *Nuts*; whoſe outward Husk is echinate and prickly, bearing a ſhort roundiſh ſhining Leaf, and having a ſmooth Bark, with its Nuts or Maſt of a triangular Figure.

The ingenious Mr. *Evelyn*, from *Palmerius*, tells us, that the *Beech* in *Theophraſtus* muſt needs be the *Oak*, and ſhews his Reaſons: But leaving this, there are of *Fags*, or *Beeches*, two or three kinds with us: The Mountain *Beech*, (where it moſt affects to grow) which is the whiteſt, and moſt ſought after by the Turner; and the *Campeſtral* or *Wild Beech*, which is of a blacker colour, and more durable. They are both to be raiſed from the *Maſt*, and govern'd like the Oak; and that is certainly the beſt way of furniſhing a Wood, unleſs you will make a Nurſery; and then you are to treat the Maſt as you are inſtructed in the account of *Aſhes*, ſowing them in *Autumn*, or later, even after *January*, or rather nearer the Spring, to preſerve them from Vermin, which are very great devourers of them: But they are likewiſe to be planted of young *Seedlings*, drawn out of places where the fruitful Trees abound. In tranſplanting them, cut off only the Boughs and bruiſed Parts, two Inches from the Stem, to within a Yard of the Top; but be very ſparing of the Root: This is for ſuch as are of pretty large Stature.

They make *ſpreading Trees*, and *noble Shades* with their well furniſhed and gliſtering Leaves, being ſet at forty foot diſtance; but they grow taller and more upright in the *Foreſts*, where at eight or ten foot they ſhoot into very long Poles, but are neither very apt for *Timber* or *Fuel*: In the Valleys, where they ſtand warm and in conſort, they will grow to a *ſtupendious* Height, though the Soil be ſtony and very barren: Alſo upon the declivities, ſides, and tops of *high Hills*, and *chalky Mountains* eſpecially; for they will ſtrangely inſinuate their Roots into the bowels of thoſe ſeemingly impenetrable places, not much unlike the *Fir*. *Virgil* reports, it will graft with the *Cheſnut*; and being prun'd, it heals its ſcars immediately, but is not apt to put forth ſo ſoon again as other Trees.

The *Beech* ſerves for various uſes: With it the Turner makes *Diſhes*, *Trays*, *Buckets*, and other *Utenſils*, *Trenchers*, *Dreſſer-boards*, &c. It is alſo uſeful to the Wheeler, Joiner, and the Upholſterer, for *Chairs*, *Stools*, *Bedſteads*, &c. For *Fuel*, *Billet*, *Bavin* and *Coal*, though one of the leaſt laſting. If the Timber lies always under Water, 'tis little inferior to Elm. Of the thin *Lamina* or *Scale* of this Wood, are made *Scabards* for Swords, and *Band-boxes*; *Boxes* for Writings, *Hat-Caſes*, and formerly *Book-covers*; ſome commend it for *Oars*. The *Maſt* is of great uſe to fat our Swine and Deer; and hath in ſome Families even ſupported Men with Bread. *Chios* endur'd a memorable Siege by the benefit of this Maſt. The Leaves (which make the moſt agreeable *Canopy* all the Summer) being gathered in Autumn, and before they are much froſt-bitten, afford the beſt *Mattreſſes* to lay under *Quilts* inſtead of *Straw*; for which purpoſe they are uſed by Perſons of Quality abroad. *Floats* for Fiſher's Nets, inſtead of *Cork*, are made of its Bark: The Shavings of the Wood are good to fine Wines; and the Aſhes of *Beech*, with a proper mixture, excellent to make *Glaſs* with.

In the Cavities of theſe Trees *Bees* much delight to hive themſelves: The ſtagnant Water in the hollow Trees, cures the moſt obſtinate *Tetters*, *Scabs* and *Scurfs* in Man or Beaſt, fomenting the part with it; and the Leaves chewed are good to preſerve the *Gums* and *Teeth*.

It is very remarkable, that from the Maſt of this Tree an exceeding ſweet Oil is extracted, even not much inferior to the Oil of Olives; and hath been accordingly uſed in *Sallads*. Mr. *Aaron Hill*, ſeveral Years ſince, wrote a Book of its Virtues, and to recommend its Uſe: And although his Views might not be altogether juſtifiable, yet his Relation of Facts were right: *viz*. That the *Oil* is ſweet, and good for almoſt all uſes; that the quantity of *Oil* extracted from the *Maſt*, is no leſs than a Gallon from a Buſhel; and that the Tree once at leaſt in three Years, never fails to afford a vaſt quantity, ſometimes forty Buſhels from one Tree. The late ill Management of ſome Undertakers ſhould not make one ceaſe to wonder, that ſo profitable a Tree ſtands every where neglected, and that its laden Boughs will not excite the Induſtry and Diligence of an *enterprizing* Age.

Aſpen and *Poplar*, *Abele*, &c.

AS to *Aſpen* and *Poplar* they are well known, and eaſily propagated; therefore I ſhall ſay the leſs. The Shade of *Poplar* is eſteemed very wholſome in Summer; but they do not become fine Walks or Avenues, by reaſon of their *Suckers*; and that they foul the Ground at the fall of the Leaf. The Leaves are good for Cattle; which muſt be ſtripp'd from the cut Boughs before they are fagotted: And this is to be done in the middle of *October*; and reſerved in bundles for *Winter Fodder*. The Wood of *White Poplar* is ſought after by the *Sculptor*; and they ſaw both ſorts into Boards; which, where they lie dry, continue a long time.

The *Aſpen* is a *White Poplar*, as likewiſe is the *Abele*: They are beſt propagated of Suckers from the Roots, the leaſt of which will take; and may in *March*, at three or four Years growth, be tranſplanted. In *Flanders* there are large Nurſeries of them; and we now, within twenty Mile of *London*, have them plentiful enough. The *Planting* is eaſily learnt; and in three Years they will come to an incredible Altitude; in twelve Years be as big as your middle; and in eighteen or twenty, arrive to full perfection. By theſe, in a little time a Man may have his Houſe in a Wood, where a little before there did not grow a Tree. The *Black Poplar* grows rarely with us, but plentifully abroad: And there is a *Mountain Poplar* near *Vienna*, of which ſome Trees have yielded Planks of a yard in breadth.

N. B. The planting this Tree in or near Gardens, is by no means to be encouraged, and the practice is always repented; for that it annoys all the Ground round about it, with its troubleſome Suckers from the moſt extended Roots.

The beſt uſe of the *Poplar* and *Abele*, is for Walks about low Grounds; but when they come to grow old, they are apt to become *knurry*, and out of proportion. The Timber is incomparable for all ſorts of *white wooden Veſſels*, as *Trays*, *Bowls*, *Diſhes*, and other *Turner's Ware*; and of eſpecial uſe for the *Bellows-maker*, becauſe it is almoſt of the Nature of *Cork*; and for Ship-pumps, though not very ſolid, yet very cloſe: Alſo for *Wooden-heels* for *Shooes*, &c. likewiſe to make *Carts*, becauſe it is exceeding light; for *Vine* and *Hop-props*, and divers *vimineous* Works. The Loppings in *January* are for the fire; but this Wood burns untowardly, and rather moulders away, than maintains any ſolid Heat: Of the Twigs, with the Leaves, are made *Brooms*, where Birch and Broom are wanting. The Juice of *Poplar* Leaves, dropp'd into the Ears, aſſuages the pain; and the Buds contus'd and mix'd with Honey, is a good *Collyrium* for the Eyes; as the *Unguent* is to refrigerate and cauſe ſleep.

Of the Aſpen Tree our Woodmen make *Hoops*, *Firewood*, and *Coals*, &c.

Walnut Tree.

THE *Walnut* is a *nuciferous European* Tree, containing in one common Husk one Nut, having a covering that is thick and pulpy, and an *Oily Kernel:* 'Tis a large Tree, of winged Leaves, *odorate*, having a *rugged Kernel*, divided into ſeveral *Lobes*.

Mr. *Evelyn* ſays, that the *Wall* or *Welch-Nut* is of ſeveral ſorts; the *ſoft* Shell and the *hard*, the *whiter* and the *blacker* Grain: The *black* bears the *worſt* Nut, but the *Timber* is much to be preferr'd; theſe we might get from *Virginia* and propagate here; they bear a *ſquare Nut*, are of all other the moſt beautiful, and the beſt worth planting; but had we ſtore of theſe, we ſhould deſpiſe the reſt of our own Product. Thoſe of *Grenoble* are next eſteem'd, for their uſe to the *Cabinet-Makers*. In all events, be ſure to plant from young and thriving Trees, bearing full and plump Kernels: though it ſhould be obſerv'd, that you are never ſure of having the ſame Tree from the Nut, becauſe Nature for the moſt part *degenerates*.

The beſt way to raiſe them, is, to plant the Nuts, and ſet them at the diſtance you would have them ſtand; for which purpoſe, beat them off the Trees ſome Days before they quit the Branches of themſelves, and keep them in their Husks, or without them till Spring, or bed them (being dry) in Sand or good Earth till *March*, from the time they fell, or were beaten off the Tree. In *March* the Nuts are to be planted, or it may be ſooner, if they are interr'd in their Husks; by reaſon the extream bitterneſs thereof renders them deadly to Worms, *&c.* It is good to ſtrew ſome *Furzes* (broken or chopt ſmall) under the Ground amongſt them, to preſerve them from *Mice* and *Rats*, when their Shells begin to wax tender; eſpecially if you ſupple them in warm Cow's Milk, as ſome Perſons do; when ſprouted, you are to plant them where they are to abide, but they are moſt impatient of tranſplanting: If there be an abſolute neceſſity of removing them, let your Tree never be above four years old; and then by no means touch the Head with your Knife, nor cut away ſo much as the very *Tap-root*, being ſo old, if you can well diſpoſe of it; ſince being of a pithy and hollow Subſtance, the leaſt diminution or bruiſe will greatly endanger the killing. It may be propagated by a Branch ſlipp'd off with ſome of the old Wood, and ſet in *February*; and 'tis certain they will receive their own Cyons being grafted, (and grafted on the Aſh they will thrive exceedingly) which improves their Fruit, and makes you ſure of the ſort: Some put a Tileſhard under the Nuts when firſt ſet, to divaricate and ſpread the Roots, which are otherwiſe apt to penetrate very deep: And ſome ſay, they may be tranſplanted when as big as one's middle, better than when much younger.

The beſt Compoſt is the ſtrewing of Aſhes at the foot of the Trees, the Salt whereof being impregnated with the Nitre of the Air, and waſh'd into the Earth, is the beſt dreſſing; whilſt the *Juice* of the fallen Leaves, though it kill the *Worm*, is noxious to the *Root*. This Tree doth not refuſe to thrive among others, and in great Woods, provided you ſtrip up the collateral Arms: It delights in a dry, ſound, and rich Land, eſpecially if it incline to a feeding *Chalk* or *Marle*; and where it may be protected from the cold Winds (though it affects cold rather than extream heat) as in great Pits, Vallies, and Highway-ſides: alſo in Stony grounds if loamy; and on Hills, eſpecially *Chalky*; likewiſe in Corn-Fields, (ſixty, or an hundred foot diſtant) where it is ſo far from injuring the *Corn*, that it is look'd upon as a great preſerver, by keeping the Ground warm, nor do the Roots hinder the *Plough*.

Walnut Trees render moſt graceful *Avenues* to Country Dwellings, and do excellently near the Hedge-rows; but had need be planted at forty or fifty foot diſtance, becauſe they affect to ſpread both their Roots and Branches. In *Germany* there are Arbours of theſe Trees for many Miles together; and other very extenſive Plantations of them: In *England* we have likewiſe great Plantations of Walnuts; at Sir *Robert Clayton*'s near *Godſtone* in *Surrey* there are ſeventy Acres of Ground that is planted, whereof a great part are theſe Trees; and his Garden alſo has ſeveral Nurſeries of young Trees to ſupply their defects. About *Carſe-Halton* there are many thouſands of theſe Trees, which celebrate the Induſtry of the Owners, and reward it with infinite Improvement.

The *French* uſe the Wood of this Tree for moſt Domeſtick Affairs: It is of ſingular account with the Joyner for the beſt grain'd and colour'd *Wainſcot*; the Gunſmith uſes it for *Stocks*; the Coach-maker for *Wheels* and *Bodies* of Coaches; the Drum-maker for *Rimbs*; and the Cabinet-maker for *Inlayings*, eſpecially the firm and cloſe Timber about the Roots, which is admirable for *Chambletted* Works. Some Wood, particularly ſuch as comes from *New-England*, *&c.* is very black of Colour and ſo admirably ſtreak'd as to repreſent natural Flowers, Landskips and other Fancies.

The Fruits of the *Walnut*, with *Husk* and all, when tender and very young, are fit for Preſerves; and for Oyl, of extraordinary uſe with the Painter in Whites and other delicate Colours, alſo for *Gold-ſize*, and *Verniſh*: The Husks and Leaves being macerated a Month in warm Water, and that Liquor poured on Walks and Bowling Greens, infallibly kill the Worms, without endangering the Graſs. The green Husk dry'd, or the firſt peeping red Buds and Leaves reduc'd to powder, ſerves inſtead of Pepper to condite Meats and Sauces. The Husks boyl'd make a good Colour to dye dark Yellow; and the Diſtillation of its Leaves with Honey and Urine, makes Hair ſpring on bald Heads. One Drachm of the inner Bark dryed, is a ſtrong *Vomit*, 'tis ſaid, for a luſty Man: For a pain in the ſide, a *Pint* of the freſh Oil of this Nut gives immediate eaſe; and the Juice of the outward Rind makes an excellent *Gargle* for a ſore throat, Water of the Leaves mundifies and heals *Ulcers*; and the Water of the Husk is ſovereign againſt *Peſtilential* Diſtempers,

One Buſhel of *Nuts* will yield fifteen Pounds of peel'd and clear *Kernels*, and that half as much *Oil*, which the ſooner 'tis drawn is the more in *quantity*, tho' the dryer the Nut, the better in *quality*. The young Nuts before they ſhell, or at leaſt before the ſhell grows hard, are ſold in the *Phyſick* Markets of *London* abundantly, the Juice of which is a principal Ingredient in *Treacle Water*. The Green Nuts preſerv'd are eſteem'd better than the ſimple Water; but perhaps not by way of *Medicine*. We endeavour to imitate *Mangoes* with green Walnuts, and alſo with large *Cucumbers*, or rather ſmall *Melons*, *&c.* which are excellent Pickles.

'Tis better to *cudgel* off the Fruit, when dropping ripe, than to gather it by hand; and ſome believe beating improves the Trees: That the Husk may open, lay them in a dry Room, ſometimes turning them with a *Broom*, but without *waſhing*, for fear of *Mouldineſs*: thoſe Nuts which come not eaſily out of their Husks, ſhould be laid to mellow in heaps, and the reſt expos'd in the Sun till the ſhells dry, elſe they will be apt to periſh the *Kernel*. Some Perſons keep them in their own Leaves, or a *Cheſt* of Walnut-tree Wood; others in *Sand*, eſpecially if you will preſerve them for a *Seminary*: Do this in *October*, and kept them a little moiſt, that they may ſpear, to be ſet early in *February*: Thus after two Years they may be remov'd a yard aſunder, cutting the Tap-roots and ſide Branches, but ſparing the Head; and being two yards high, bud and remove them immediately, that you may be ſure of a good ſort.

After the *Nuts* are beaten down, the *Leaves* ſhould be ſweep'd into heaps and carried away, becauſe their extream Bitterneſs impairs the Ground, and prejudices the Trees. *Old Nuts* are not reckon'd wholeſome till macerated in warm, and almoſt boyling Waters; but if you lay them in a *Leaden Pot*, and bury them in *Earth* free from Vermin, they will keep very plump the whole year about, and may eaſily be *blanched*.

It may be further obſerved of the Walnut, that it is one of the moſt profitable Trees that can be planted, and if it likes its *Situation* and *Soil*, is a quick grower. It will not indeed thrive on the Tops of *bleak Hills* nor in *wet Vales*, but it will proſper well both of on the *ſides* of Hills, and in *dry Vales*; in Soils that are either *Chalky* or *Gravelly*, or *Loamy*. It refuſes almoſt no Soil but *ſtrong Clay*, and *barren Sands*: But ſo great is the difference betwixt a *Walnut* removed with the Loſs of its Tap-root, and another of the ſame age ſtanding in the Nurſery *without a Remove*, that Mr. *Bradley* tells us he obſerved one of the *Laſt* after forty years was valued at five Pounds, whilſt one of the *Firſt* of the ſame age was not worth thirty Shillings, tho' they ſtood both together. *N. B.* They will never thrive where they are much expoſed to cold Winds.

Lime Tree.

THE *Lime Tree* bears its Seeds in ſingle Teguments or Coverings, contain'd in round Buttons. It hath broad Leaves ending in a point, being ſmoother *above* than *underneath*, bearing a ſweet Bloſſom, and a round Fruit, about the bigneſs of a Pea, containing *one Seed*.

Mr. *Evelyn* tells us that of theſe Trees there are *two* kinds, the *Male* (which ſome think but a finer ſort of *Elm*) and the *Female*: Tho' this diſtinction Mr. *Cook* will not allow, becauſe *both* bear Seed. The *Male* is harder, fuller of Knots, and of a redder Colour, but producing neither Flower nor Seed (ſo conſtantly and ſo mature, with us) as does the *Female*, whoſe Bloſſom is alſo very *Odoriferous*, perfuming the Air: The *Wood* is likewiſe thicker, of ſmaller Pith, and not obnoxious to the Worm.

Lime Trees may be raiſed either of the Seeds in *October*, or with better ſucceſs by the *Suckers* and Plants; which ſhould be cultivated like the *Elm.* Be ſure to collect your Seeds in dry weather, airing them in an open Room, and reſerving them in Sand till *Mid-February*, when you may ſow them in pretty ſtrong freſh and loamy Mould, kept ſhaded, and moiſt as the ſeaſon requires, and clear of Weeds; and at the period of two years plant them out, dreſs'd and prun'd, as diſcretion ſhall adviſe. It is not only raiſed by Seed, by Suckers and Layers at the Roots; but even by Branches lopp'd from the Head, may this Tree be propagated; and peeling off a little of the Bark, at a competent diſtance from the Stem or Arms, and covering it with Loam mingled with rich Earth, they will ſhoot their Fibres, and may be ſeaſonably ſeparated; but to accelerate this, apply a *Ligature* above the place when the Sap is aſcending, or beneath when it deſcends: From *June* to *November* you may lay them; the Scrubs leſs erect, do excellently to thicken Coppices; and will yield luſty ſhoots, and uſeful Fire-wood.

The *Lime* affects a rich feeding loamy Soil, where they will grow incredibly for ſpeed and ſpreading: They may be planted as big as ones Leg, their heads topp'd at about ſix or eight foot bole; thus they become of all other the moſt proper and beautiful for Walks, as producing an upright Body, ſmooth and even Bark, ample Leaf, ſweet Bloſſom, and a goodly Shade, at the diſtance of eighteen or twenty foot: They are alſo very patient of pruning, and may be clipt into any ſhape, tho' the *Conical* is that it moſt affects; but if they taper over much, ſome collateral boughs ſhould be ſpared to check the Sap, which is beſt done about *Midſummer*; and to make the Tree grow upright, take off the prepondering Branches with diſcretion, and ſo indeed you may correct any other Tree, and redreſs its *obliquity.* The *Root* in tranſplanting muſt not be much lopp'd; which is alſo a good leſſon for all young planted Trees: And the diſtance for Walks and Avenues may in rich Ground be twenty foot, in a more ordinary fifteen or ſixteen foot.

The *Elector Palatine* did at *Midſummer* remove very great *Lime Trees* from one of his Foreſts to a ſteep Hill, exceedingly expos'd to the Sun, at *Heidleburgh*: They grow behind that ſtrong Tower on the *South-Weſt*, and moſt torrid part of the Eminence; being of a dry, reddiſh, barren Earth; and yet do they proſper very well: But the Heads were cut off, and the Pits into which they were tranſplanted were fill'd with a compoſition of Earth and Cow-Dung, which was exceedingly beaten, and ſo diluted with Water, as it became almoſt a *liquid Pap:* In this were the Roots plunged, covering the Surface with the Turf, which is a ſingular Example for others to follow, and imitate.

Other Perfections of this Tree (beſide its *unparalel'd* Beauty for Walks) are, that it will *grow* in almoſt all grounds; that it *laſts* long, it ſoon *heals* its ſcars, it ſtoutly *reſiſts* a ſtorm, and ſeldom becomes *hollow.* Thoſe Royal Plantations of theſe Trees, in the Parks of *Hampton Court* and *St. James*'s, will ſufficiently inſtruct how theſe and all other ſingle Trees are to be govern'd and defended from Injuries till they are able to protect themſelves: Some ſhelter them with three or four *Deal Boards*; which yet is not ſo much approv'd of, by reaſon it keeps them from the free Air.

Sir *Thomas Brown* of *Norwich* gave an account of a *Lime-tree* at *Depeham* in *Norfolk*, that in the leaſt part of the Trunk (which was about two yards from the ground) was at leaſt eight yards and a half in Circumference; about the Root near the Earth ſixteen yards, and about half a yard above that, about twelve yards: The height to the uppermoſt Boughs about thirty yards.

The Timber of a well grown *Lime*, is convenient for any uſe that the Willow is; but much to be preferr'd, as being both ſtronger, and yet lighter; and therefore fit for Yokes, and Boxes for the Apothecaries: Becauſe of its colour, and eaſy working, and that it is not ſubject to ſplit, Architects make with it Models for their deſigned Buildings; and ſmall Statues, and little curious Figures have been carv'd of this Wood: With the Twigs, Baskets and Cradles are made, and of the ſmoother ſide of the Bark Tablets for Writing. The *Grecians* made Bottles of it, which they finely rozin'd within ſide.

The *Gravers* in Wood do ſometimes make uſe of this fine Material; and even the courſeſt Membrane, or Slivers of the Tree, growing between the *Bark* and the main *Body*, they now twiſt into *Baſs-ropes*; beſides, the *Truncheons* make a far better *Coal* for *Gunpowder* than that of *Alder* it ſelf: And the extraordinary *Candor* and *Lightneſs* of this Wood, has dignified it above all the Woods of our Foreſt in the hands of the Right Honourable the *White-ſtaff* Officers of the Court.

As to the Virtues of this Tree, it is of admirable effect againſt the *Epilepſy*; for which the delicately ſcented Bloſſoms are held prevalent. The *Berries* reduc'd to Powder, cure the *Dyſentery*, and ſtop Blood at the Noſe: The diſtill'd Water is good againſt the *Apoplexy*, *Vertigo*, *trembling* of the Heart, *Gravel*, *&c.* And ſome uſe a Medicine made of the Bark for Wounds and other Diſtempers.

The Sycamore Tree.

MR. *Evelyn* calls the *Sycamore* the *Acer majus* or a ſort of *Maple*. It is multiplied very readily by its own Seed or Keys, which it bears in a plentiful manner, and come up the firſt Spring after ſowing. They may alſo be propagated by *Suckers* or *Layers*, but the *firſt* way is the beſt.

They bear tranſplanting very well, and therefore may be removed of any ſize, provided the Head be lopp'd and made ſomething proportionable to the Root. Only it being a ſpungy Wood, the greater wounds ſhould be covered with Clay mixt with Cow-dung. It is a Tree mightily propagated and planted in the Biſhoprick of *Durham*; where it thrives and reſiſts the ſtrongeſt Winds this Country is ſubject to: And beſides, not being fit for any of the uſes of the *Waggon-ways* for Coals, they have eſcaped the common plunder and demand for Timber; which is *almoſt* the only thing deſireable in Life this Country is deſtitute of for real Uſe and Ornament.

Theſe Trees however preſent themſelves frequently in Hedge-rows, and are an excellent defence againſt the Winds, eſpecially near the Sea where hardly any other Tree will grow. One would not chuſe to plant them near fine Walks and Gardens, becauſe their large Leaves are apt to defile them; and it is alſo obſerved that they breed many Inſects from the Honey-dew which this Tree is apt to retain; and *therefore* ſo friendly and kind to the *Bees*.

Of this Wood the Turner makes *Trenchers* and *Diſhes*, being *ſoft* and *white*. And it is not leſs uſeful for Cart and Plough Timber, being *light* and *tough*. The *Sap* will run from this Tree in great plenty, when the Bark is opened, and ſome think it as wholeſome as *Birch*, when mix'd with Malt, and made into ſtrong Beer.

What follow next are Trees of an humbler ſize.

Alder Trees.

THE Alder is a *Coniferous* Tree, bearing ſmall Cones; and grows in watery Places, having Leaves of a dark Green, undulated and ſhaped like thoſe of the *Nut Tree*.

'Tis of all other Trees the moſt faithful Lover of *Watery* and *Boggy* Places, and thoſe moſt deſpis'd *weeping parts* or Water-galls of Foreſts. They are propagated of *Truncheons*, (for ſo they raiſe them in *Flanders*; and make wonderful profit of the Plantations) like the Poplar; or of Roots; which way Mr. *Evelyn* prefers, being ſet as big as the ſmall of ones Leg, and in length about two foot, whereof one ſhould be plunged in the Mud: This profound fixing of *Aquatic-Trees* being to preſerve them ſteady, from the Concuſſions of the *Winds*, and violence of the *Waters*, in their *liquid* and *ſlippery* Foundations. They may be placed at four or five foot diſtance, and when they have ſtruck Root, you may cut them, which will cauſe them to ſpring in *Clumps*, and to ſhoot out into many uſeful *Poles*. But if you plant ſmaller Sets, cut them not till they are arrived to ſome competent bigneſs, and that in a proper ſeaſon; which is a Rule for all the Aquatics, and ſoft Woods; not till Winter be well advanced, in regard of their pithy ſubſtance: Therefore, ſuch as you have occaſion to make uſe of before that Period, ought to be well grown, and felled with the earlieſt, that ſo the ſucceſſive ſhoots receive no Prejudice.

There is another way of planting *Alders*, after the *Jerſey* manner; *viz.* by taking Truncheons of two or three foot long, at the beginning of Winter, and bind them in *Faggots*, and place the ends of them in Water till towards the Spring, by which ſeaſon they will have contracted a ſwelling *Spire* or *Knur*, about that part, which being *ſet* does never fail of growing and ſtriking root. There is alſo a *black ſort* more affected to Woods and drier Grounds.

Some adviſe to plant ſhoots of Alder, and ſo of all the *ſwift growing* Trees, being of ſeven years growth; ſloping off both the ends towards the Ground, to the length of a *Billet*, and burying them horizontally a reaſonable depth in the Earth: This will cauſe them to put forth ſeven or eight branches, each of which will become a Tree in a ſhort time, eſpecially if the Soil be moiſt. The diſtance for Alder Plantations, ought not to be more than five foot at firſt; ſince every felling renders them wider for the benefit of the Timber, even to thirty and forty foot in five or ſix Fellings.

You may cut *Alder* and other *Aquatick Trees* every third or fourth year; and ſome do it more frequently: They ſhould alſo be abated within half a foot of the principal Head, to prevent the periſhing of the *Main Stocks*; and to accelerate their ſprouting. And the laying of

Truncheons in *Water* for a while; after they are fitted to the ſize, is generally approv'd to be a good method to prepare them.

Some weakly enough extirpate theſe *Trees* from their Boggy Places, and yet know not how to turn them to better uſe. The ſhadow of this Tree doth nouriſh the Graſs growing under it; and being ſet and well plaſh'd, is an excellent defence to the Banks of Rivers; ſo that *Authors* have wondered it is not more practiſed about the *Thames,* to fortify and prevent the mouldring of the Walls and Banks from the violent Weather they are expos'd to.

Of old they made Boats of the greater parts of theſe Trees, and, excepting *Noah's Ark*, the firſt Veſſels we read of were made of this *Wood.* And as then, ſo now, are our over-grown *Alders* frequently ſought after for ſuch Buildings as lye continually under Water, where it will *harden* like Stone; whereas being kept in any *unconſtant* temper it *rots* immediately. *Vitruvius* tells us that the *Moraſſes* about *Ravenna* in *Italy* were piled with this Timber, to ſuperſtruct upon: And it was uſed under that famous *Bridge* at *Venice*, the *Rialto*, which paſſes over the Grand-Canal, bearing a vaſt weight.

The Poles of *Alder* are as uſeful as thoſe of *Willows*; but the *Coals* far exceed them, eſpecially for *Gunpowder*: The Wood is uſeful for *Piles*, *Pumps*, *Hop-poles*, *Water-pipes*, *Troughs*, *Sluces*, *Small Trays*, and *Trenchers*, *Wooden-heels*, &c.

The *Bark* of *Alder* is precious to Dyers; and ſome Tanners and Leather-dreſſers make uſe of it; and with it and the fruits (inſtead of Galls) is compos'd an Ink; for if macerated in Water, with a little ruſt of Iron, it makes a black Dye, which may be likewiſe uſed for Ink. The interior Rind of the *Black Alder*, purges all *Hydropic* and *ſerous* Humours; but it muſt be dried in the ſhade, and not uſed *Green*; and the *Decoction* is to ſettle two or three days before it be drunk. Being beaten with Vineger it heals the Itch.

Birch Tree.

THIS is a Tree bearing its Seeds in *ſingle Teguments* or Coverings, of ſmall Leaves, having ſlender *reddiſh* twigs, with *ſmooth* and *white* Branches.

The *Birch* is ſaid to be a *Natural* Tree of *England*; and is altogether produced of *Roots* and *Suckers*, (tho' it ſheds a kind of Seeds like the *Elm* about the Spring) which being planted at four or five foot interval, in ſmall twigs, will ſuddenly riſe to Trees, provided they affect the Ground, which cannot well be too *barren*: For it will thrive in the *dry*, *wet*, *ſandy* and *ſtony*, and even in *Marſhes* and *Bogs*; the Water-galls and *Uliginous* or Mooriſh Parts of Foreſts, that will hardly bear any Graſs, do many times *ſpontaneouſly* bear it in abundance, whether the ſituation be high or low, and nothing comes amiſs to it. Plant the ſmall Twigs or Suckers having Roots, and after the firſt year cut them within an inch of the Surface; this will cauſe them to ſprout in ſtrong and luſty *Tufts*, fit for *Coppice* and *Spring-Woods*; or by reducing them to one Stem, you may render them in a very few years fit for the *Turner*.

Though Birch be the *worſt of Timber*, yet it is uſed for *Ox-yokes*; alſo for *Hoops*, *Panniers*, *Brooms*, *Wands*; *Arrows*, *Bolts*, *Shafts*; *Diſhes*, *Bowls*, *Ladles*, and other *Domeſtick Utenſils*. In *New-England*, our *Northern Americans* make of it *Canoo's*, *Boxes*, *Buckets*, *Kettles*, and *Diſhes*, (which they ſow, and join very curiouſly with Thread made of *Cedar-Roots*) and divers other Utenſils, whereof they have a blacker kind: They make alſo ſmall-craft *Pinnaces* of *Birch*, ribbing them with *white Cedar*, and covering them with large Flakes of *Birch-Bark*: They ſow them with Thread of Spruce-Roots, and pitch them as we do here in *England*.

This Wood is uſeful for *Fuel*, great and ſmall *Coal*, which *laſt* is made by charring the ſlendereſt Bruſh and ſummities of the Twigs: The inner Bark was anciently uſed for *Writing Tables*, before the invention of *Paper*; and with the outward and thicker Bark are divers Houſes in *Ruſſia*, *Poland* and other *Northern* Tracts, covered inſtead of *Tile*. Of the *whiteſt* part of the old Wood, found commonly in doating *Birches*, is made Grounds for ſweet Powder; and of the quite conſum'd and rotten Trees is made the beſt *Mould* for raiſing of divers Seedlings of the rareſt Plants and Flowers. Neither ſhould it be forgotten, that from this Tree a Liquor is drawn which mix'd with a due quantity of *Sugar* makes excellent *Wine*: And being skilfully tapp'd in *March*, there will flow from it, betwixt the Wood and the Bark, an incredible Quantity of Juice very *palatable*.

Hazel Tree, and Filbert.

THE *Hazel* is a *Nuciferous European* Tree, containing in a common Husk, one Nut, open at one end, being ſmaller Trees than *Walnut* or *Almond*, of broad indented Leaves, bearing *Catkins*; of a leſſer Kernel and thicker Shell than *Filberts*, and whoſe *Husk* is ſhorter.

It is beſt raiſed from the *Nuts* (altho' they are alſo rais'd by *Suckers* and *Layers*) which ſow like Maſt, in a pretty deep Furrow towards the end of *February*; or treat them as directed for the *Walnut*: Light Ground may be immediately ſown and harrowed in, very accurately; but if *Clay*, plough it earlier, and let it be ſufficiently mellow'd with the Froſts; and then the third year cut your Trees near to the Ground with a ſharp Bill.

But for a Grove for Pleaſure, plant them in *Foſſes* at a yard diſtance, and cut them within half a foot of the Earth, dreſſing them for three or four *Springs* and *Autumns*, by only looſening the Mould a little about their Roots. Others ſet the Nuts by hand, at one foot diſtance, to be tranſplanted the third year at a yard aſunder: Do this when Winter is far advanc'd; becauſe they are exceedingly obnoxious to the Froſts; nor will they ſprout till the *Spring*; and *Vermin* greatly devour them: Preſerve them therefore moiſt, not mouldy, by laying them in their own dry Leaves, or in Sand, till *January*.

From this Management they thrive very well, the ſhoots being like ſmall *Wands*, and *Switches*, or ſomewhat bigger; and ſuch as have drawn divers hairy twigs, are by no means to be disbranch'd, no more than their Roots, unleſs by a very ſparing and diſcreet hand: Thus your Coppice of *Hazels* being planted about *Autumn*, may be cut within three or four inches of the Ground, the Spring following. Mr *Evelyn*, would ſpare them two or three years, when they have ſtrong hold, and may be cut cloſe to the Earth; the *unproſperous* and *feeble* ones eſpecially. Filberts are thus to be treated, and both of them much improv'd by tranſplanting; but chiefly by Grafting on the common *Hazel* raiſed from Seed.

For the place of Growth, they above all affect cold, barren, dry and ſandy Grounds; Mountains, and even *Rocks* will produce them; but more plentifully, if ſomewhat moiſt, and moſſie; they will grow well on ſides of Hills, and in Hedge-rows.

Such as are maintain'd for Coppices may after twelve years be fell'd the firſt time; the next at ſeven or eight, &c. for by this period their Roots will be completely *vigorous*. You may plant them from *October* to *January*, provided they are carefully weeded, till they have taken faſt hold; and there is not among all our ſtore a more profitable Wood for Coppices. *N. B.* Thoſe who ſet Nuts, ſhould by picking get the *largeſt* they can find.

There is a compendious Expedient for the thickning of Coppices, which are too *tranſparent*, by laying of a *Sampler* or Pole of an *Hazel*, *Aſh*, &c. of twenty or thirty foot in length (the Head a little lopp'd) into the Ground, giving it a chop near the foot, to make it lye *eaſy*; this faſtened to the Earth with a *Hook* or two, and covered with ſome freſh Mould at a competent depth, will produce a great many *Suckers*, thereby furniſhing a Coppice very ſpeedily.

The uſe of the *Hazel*, is for *Poles*, *Spars*, *Hoops*, *Angling-Rods*, *Faggots*, *Coals*, &c. and it makes one of the *beſt Coals*; once us'd for *Gun-powder*, being very fine and light, till *Alder* was found to be more fit: Alſo it is much us'd for *Riding Switches*, *Hurdles*, &c. of which laſt *Walls* are made, inſtead of *Laths* and *Puncheons*, ſuper-induc'd with a courſe Mortar made of Loam and Straw: Theſe Walls incloſe divers Cottages, Sheds and Outhouſes in the Country, being ſtrong and laſting; and ample Incloſures of Courts and Gardens have been ſo ſecured. This is practiſed much in *Bedfordſhire*.

There is no *Wood* which purifies *Wine* ſooner than the Chips of *Hazel*.

The Horn Beam.

THE *Horn Beam* is but of one kind, and is generally admired for its Shade and the pleaſant *Verdure* of its Leaves. It is moreover greatly reſpected for its early puſhing forth, and holding its Leaves a long time; for even after they have loſt their colour they continue on the Tree till new ones thruſt them off. By which means it becomes very valuable for Eſpaliers that are to defend the tender Plants from external Violence: It is alſo the moſt *tonſile* Plant, and bears well the diſcipline of the Sheers, ſo as to become almoſt an *impenetrable* Defence. One of the greateſt Beauties of the fine Gardens at *Verſailles* is thought to conſiſt in the *Tallneſs*, and exact *Regularity* and *Beauty* of theſe Hedges; and in *Italy* the fineſt Grotto's and Wilderneſſes are made with them.

But as it is good for Hedges, ſo alſo, if it is neglected, it becomes an uſeful *Foreſt-tree* for ſhade; and they make excellent *Pollards.* Both the Rind and Wood is *rough* and *hard*, and of a *whitiſh* Colour. It bears Flowers in the form of ſtrings, which conſiſt of ſeveral little Leaves faſtened about it like ſhells, and underneath are ſeveral *Stamina.*

It may be raiſed either of *Seeds*, or increaſed of *Layers*. But foraſmuch as the Seed lieth in the Ground a whole year before it peeps, (as the *Aſh* and *Holly*) the beſt way to raiſe it, is either from *Layers* or rather from *Sets*, which are eaſily procured in the Woods where they grow, being apt to ſtool with *Suckers* from the Root.

There are few Soils which they refuſe, both *Hills* and *Dales* ſuit them, and they will grow even where they are overtopp'd and dropt on by larger Trees; and yet few Trees make more haſte in growing. The Timber of this is uſeful for *Mill-Cogs*, &c. exceeding all others for ſuch ſort of Uſes. It is good alſo for *Yoke-Timber*, *Heads of Beetles*, and *Handles for Tools*, and for the *Turners* uſe, being *tough* and *white.* It makes excellent Billeting, and is fit Fuel for a *Ladies* Chamber.

Maple Tree.

THE Maple is a Tree bearing its Seeds in ſingle Teguments or Coverings, that are *Membranaceous*; the Seed-veſſels or Keys being double, and having ſmall Leaves divided into five Segments, and 'tis a *Brittle* Wood.

This Maple, of which Authors reckon ſeveral kinds, was of old held in equal Eſtimation almoſt with the *Citron*; eſpecially the *French Maple*, and the *Peacocks-tail Maple*, which is elegantly *undulated* and criſp'd into variety of *Curls*; the Maples we have in *England* differ very little, and they are produc'd of the Keys like the Aſh, and like to it affect a *ſound* and *dry* Mould; growing both in Woods and Hedge-rows, eſpecially in the latter, which if the Ground be rather hilly than low, afford the faireſt Timber. It is alſo propagated by *Layers* and *Suckers*: By ſhredding up the Boughs to a Head, it will ſhoot to a great height in a little time; but if you will Lop it for the Fire, do it in *January*; keep no Pollards or ſpreading Trees, for a clammy Dew falls from them, that hurts what grows under.

The Timber is far ſuperior to *Beech* for all the uſes of the Turner, who ſeeks it for *Diſhes*, *Cups*, *Trays*, *Trenchers*, &c. as the Joyner, for *Tables*, *Inlayings*, and for the *delicateneſs* of the Grain, when the *Knurs* and *Nodoſities* are rarely *diaper'd*, which does much advance its Price. Alſo for its *lightneſs*, it is employ'd often by thoſe who make *Muſical Inſtruments*. The larger ſort of it we call the Sycomore, but the deſcription of this *leſſer Maple*, and the ancient value of it, is worth the citing.

The *Maple* (ſays *Pliny*) for the Elegancy and Fineneſs of the Wood, is next to the very *Cedar* it ſelf: There are ſeveral kinds of it, eſpecially the *white*, which is wonderfully beautiful; this is call'd the *French Maple*: The other has a curl'd grain, ſo curiouſly *maculated*, that from a near reſemblance it was uſually call'd the *Peacocks-tail*, *&c.* The *Bruſcum* or *Knur*, is wonderfully fair, but the *Molluſcum* is counted moſt precious; both of them knobs and ſwellings out of the Tree:

Large Planks for Tables were of old preferr'd to *Cedar* and *Citron*; but now they are uſed only for ſmall *Table Books*; and with its thin Boards, Bed-teſters are wainſcotted.

The *Bruſcum* is of a blackiſh kind, with which they make Tables. *Cicero* had a Table of this Wood which coſt him Ten thouſand *Seſterces*: Such another had *Aſinius Gallus*. That of King *Juba* was ſold for 15000; and another we read of for 140000. *H. S.* which at 3 *d. Sterling* ariſes to about 1750 *l.* and yet that of the *Mauritanian Ptolomy*, was far richer, containing four foot and a half Diameter, and three inches thick, which is reported to have been ſold for its Weight in Gold.

The *Knot* of this Timber was moſt eſteem'd; which is much reſembled by the *Female Cypreſs*; and we have now as beautiful Planks of ſome *Walnut-trees*, near the Root; but the great Art, in ancient Times, to make the Maple, &c. ſo exceeding fine, was in the *Seaſoning* and *Politure*.

There have been ſome Maples of large *Bulk* and noble *Shades*: *Virgil* choſe it for the Court of his *Evander*, one of his worthieſt Princes, where in his beſt of Poems he deſcribes him ſitting in his *Maple-Throne*; and when he brings *Æneas* into the Royal Cottage, he makes him this great and memorable Compliment.

> *This humble Roof, this Ruſtick Court, ſaid he,*
> *Receiv'd* Alcides *crown'd with Victory:*
> *Scorn not (great Gueſt) the Steps where he has trod,*
> *But contemn Wealth and imitate a God.*

The *Romans* were *madly* luxurious for buying *Tables* and other Furniture at very great Rates; and when they at any time reproached their Wives for their expenſiveneſs in *Pearl* and other rich *Trifles*, they were wont to retort and turn the *Tables* upon their Husbands.

The Service Tree, or Sorbus.

SOME fancy there are ſeveral kinds of this Tree, but we find little difference in *England*, only that ſome of them bear a larger Berry than others, which perhaps is more owing to the *Soil* than the *Sort*.

It bears a Cluſter of white Bloſſoms in the Spring, which ſeldom fail to afford ſo many Berries in *Autumn*, ſomething bigger than Haws, which after they come to appear rotten in *October* are eaten with great greedineſs by many, having a pleaſant and grateful Acidity: But they are not reckoned wholeſome for ſome Conſtitutions, as they are in a great degree *coſtive*. They may be raiſed from the Berries; but the beſt and quickeſt way is from *Suckers*, which they put forth very plentifully. They may be tranſplanted of any bigneſs; and if they are *headed*, the wound will quickly heal up. You cannot fail to furniſh your ſelf with any quantity from the Woods, where they naturally grow, and are a proper Stock whereon to graft either the *Medlar* or *L'Azzerole*; of which more anon.

The Timber (for they will ſometimes grow large) is uſeful for the Joyner and Turner, for *Bows*, *Pullies*, *Screws*, *Mills*, *Spindles*, *Piſtol* and *Gun-ſtocks*, being of a very *fine grain*, and if aſſiſted with ſome boiled *Linſeed Oil* will be made to counterfeit *Ebony* and moſt of the *Indian Woods*. This Tree makes an early appearance in the Spring both with its Leaves and Bloſſoms, and therefore ſhould be planted within View for its Beauty. It cures the Green Sickneſs, diſtill'd in Water.

The Wild Pear, and the *Crab.*

THESE are *both* of them *Foreſt-trees*, and will arrive to a conſiderable ſtature from the Kernels of both; from which are produced great Varieties in their Fruit by a kind of *Luſus Naturæ*. The *Wild Pear*, is long before it bears any Fruit from the Seed; but it afterwards amply rewards that *Lazineſs*, by annual and plentiful Crops; of the Fruit is made in ſome Countries a moſt delicious Liquor called *Perry*, which is eſteemed to be equal to moſt of the *French White-wines* both in ſtrength and goodneſs; eſpecially if it be kept three or four years. But it is ſeldom ſuffered to come into private hands abroad; for the Vintners in *London* greedily buy it and fetch it from *Herefordſhire*, and ſome parts of *Glouceſterſhire*, to mix with ſome of their ſtrongeſt *Spaniſh* Wines, as they do alſo ſome of the richeſt *Cyders*; the beſt of which Liquor is alſo made from Apples never grafted, but raiſed from the Seed; which tho' they retain an unpleaſant *roughneſs* to the Taſte from the Tree; yet make better and richer *Cyder*, than the beſt of the eating Apples grafted.

The Wood of theſe Trees, eſpecially the *Pear*, bears an excellent ſmoothneſs and politure in all ſorts of *Wooden Ware*; and the Joiner covets it much for *Tables*, *Cheſts of Drawers*, and *Wainſcot*. The Wood of the *Crab* is very tough, and is much uſed by the Farmer for *Flails* to beat out Grain, and for *Cudgels* or *walking-ſticks*; eſpecially ſuch as are uſed in a way of *Diſcipline*. The very worſt and ſmalleſt Fruit of the Crab affords a *Verjuice* mighty uſeful in the Kitchen; and in moſt ſorts of *Condiments*, is thought much better than *Vinegar*.

The Mulberry.

OF this Tree I ſhall ſay little here, having already ſpoke of it in the Fruit-Garden. There are two ſorts of it, the *Black* and the *White*. The *firſt* is a ſlower, the *laſt* a much quicker Grower. They both bear *Catkins*, producing *male* and *female* Bloſſoms at the ſame time. But becauſe the *White Mulberry*, bears a leſs and more indifferent Fruit, but is yet the quickeſt Grower, it is adviſeable to graft the *Black* upon the *White*, to accelerate its growth, and to mend the Fruit. It is raiſed from the *Seed*, from *Suckers*, and from *Cuttings*, ſet in a ſhady place. They love a light and warm Soil, where they will grow to be very large, and make an handſome ſhade in the four Summer Months amongſt the *Foreſt-Trees*. The beſt time for tranſplanting them is in *Autumn*. But they ſhould be carefully taken up, having long Roots, and yet as few of them as poſſible ſhould be taken off. It need not be repeated how uſeful theſe Trees are to the *Silkworm*, and what Profit might accrue to the Nation, if the Culture of them was more encouraged, and the *Silk Trade* put into a right method of Manufacture. Of which more in another place.

Cheſnut Tree.

THIS is a *Nuciferous*, *European* Tree, containing in one common Husk ſeveral *Nuts*, whoſe outward Husk is *echinate* and *prickly*; and hath *long*, *ſmooth*, *deeply indented* Leaves, its *Husk* containing three or four *Nuts*.

Pliny reckons many kinds of *Cheſnuts* about *Tarentum* and *Naples*; but we commend thoſe of *Portugal* and *Bayonne*, chuſing the largeſt, brown and moſt ponderous Fruit; but the leſſer ones to raiſe for Timber: They are produc'd beſt by *ſowing*; previous to which, let the Nuts be firſt ſpread to *ſweat*; then cover them in Sand; a Month being paſt plunge them in Water, reject the Swimmers; being dry, for thirty days more ſand them again, and water them as before: Being thus treated till the beginning of Spring or in *November*, *ſet* them like Beans, and as ſome do, *drench'd* for a Night or more in *new Milk*.

They are to be put into the holes with the point *upmoſt*; one in a hole will do, if try'd as before, nor will any of them fail, unleſs by ſome Accident: But being come up, they thrive beſt unremov'd, making a great ſtand for at leaſt two years, upon every *tranſplanting*; yet if needs you muſt alter their ſtation, do it about *November*, and that into a light Ground, or moiſt *Gravel*; tho' they will grow in *Clay*, *Sand*, and all mixed Soils, upon expoſed and bleak Places, and the pendent declivities of Hills to the *North*, in dry airy places; and ſometimes they thrive near *Marſhes* and *Waters*; but they affect no Compoſt, ſave what their own Leaves afford them, and are more patient of *Cold* than *Heat*: As for the ſowing in the Nurſery, treat them as you do the *Walnut*.

If they are ſet in *Autumn* or *Winter*, it is beſt to inter them within their Husks, which being every way arm'd, are a protection againſt *Mice*, and other *Vermin*, which would deſtroy them. Some ſow them confuſedly in the Furrow like the *Acorn*, and govern them as the *Oak*: But then ſhould the Ground be broken up between *November* and *February*; and when they ſpring, be cleanſed at two foot aſunder, after two years growth: Likewiſe *Coppices* of Cheſnuts may be wonderfully increaſed and thickened by Laying the tender and young Branches; but ſuch as ſpring from the Nuts are beſt, and will thrive exceedingly, if (being let ſtand without removing) the Ground be ſtirr'd, and looſned about their Roots, for two or three of the firſt years, and the ſuperfluous Wood prun'd away; and indeed for good Trees they ſhould be ſtripp'd up after the firſt years removal; they alſo ſhoot into very good *Poles* from a felled Stem: Thus will you have a Coppice ready for felling, within eight years, which (beſides many other uſes) will yield incomparable *Poles* for any Work of the *Garden*, *Vineyard*, &c. till the next cutting: And if the Trees like the Ground, will in ten or twelve years grow to a kind of Timber, and bear plentiful Fruit.

Cheſnuts have been tranſplanted as big as a Man's Arm, their Heads being cut off at five or ſix foot high; but they came on *at leiſure*: In all Plantations for Avenues, you may ſet them from thirty to ten foot diſtance, though they will grow much nearer; when tender, you cultivate them like the *Aſh*, the nature of whoſe ſhade they reſemble, ſince nothing affects much to grow under them: Some ſay that the young

Cheſnut Trees ſhould not be prun'd or touched with any Edge-tool, for the firſt three or four years, but rather cropp'd or broken off, which is left to Experiment.

The *Cheſnut* being grafted in the *Walnut*, *Oak*, or *Beech*, it is ſaid will come exceeding fair, and produce incomparable Fruit: And it is wiſh'd we did more univerſally propagate the *Horſe Cheſnut*, which being eaſily increas'd from Layers or from the Seed, grows into a goodly Standard, and bears a moſt *glorious* Flower, even in our cold Country, but a very nauſeous Fruit; as may be ſeen at Sir *William Aſhurſt*'s at *Highgate*, and ſeveral other places, but eſpecially at the Biſhop of *London*'s at *Fulham*.

The *Cheſnut* was firſt brought from *Conſtantinople* to *Vienna*, thence into *Italy*, whence it was propagated in *France*, and thence among *us*. It is (next the *Oak*) one of the moſt ſought after by the *Carpenter* and *Joyner*; and it formerly built a good part of our ancient Houſes in *London*: This Tree affords the beſt *Stakes* and *Poles* for *Paliſadoes*, *Pedaments* for *Vine Props*, and *Hoops*, alſo for *Mill Timber* and *Water-works*, or when it may lie *buried*; but if *Water* touch the Roots of the growing Trees, it ſpoils both *Fruit* and *Timber*. The Timber does well for *Columns*, *Tables*, *Cheſts*, *Chairs*, *Stools*, *Bedſteads*, for *Tubs* and *Wine Casks*, which it preſerves with the leaſt Tincture of the Wood of any whatſoever: If it be dipp'd in ſcalding Oil, and well pitcht, it becomes exceeding durable: but otherwiſe, contrary to the *Oak*, it will make (like many other things in the World) a fair ſhew *outwardly*, when it is all rotten *within*.

As to the Fruit of this Tree, 'tis beſt to *beat* it from the Trees, ſome little time before they are ready to fall of themſelves; thus they will keep the better; or elſe you muſt *ſmoke-dry* them: They are commended highly for Food, and the beſt Tables in *France* and *Italy* make them a *Service*, eating them with Salt in Wine, or Juice of Lemon and Sugar; being firſt *roaſted* in Embers. They are here uſed in ſtewed Meats, &c. by our *French* Cooks; and they are beſt preſerved in Earthen Veſſels, in a cold place; ſome lay them in a Smoke-loft, others in dry *Barley-Straw*, *Sand*, &c. The way of eating them in *London*, is by *boiling* them till ſomewhat ſoft, which will make the Shells come off eaſily, and then we eat them either hot or cold: If thus prepar'd they were eaten with Butter, Vinegar and Pepper, as we eat *Potatoes*, there is no doubt but that they would be an acceptable Diſh.

The Leaves of the *Cheſnut* Tree make very wholeſome *Mattreſſes* to lye on; and they are good *Litter* for Cattle: The Coals of this Tree are excellent for the Smith, being ſoon *kindled*, and as ſoon *extinguiſh'd*; but the Aſhes will *ſtain* Linnen, if a Lee be made of them and it is waſhed therein. The *Flower of Cheſnuts*, is an approv'd Remedy againſt *Spitting of Blood*, and the *Cough*, being made into an *Electuary* with Honey.

The Wild Cherry, Black and *Red.*

THERE are two ſorts of the *Wild Cherry*, which bear Fruit very plentifully, Black and Red, and which grow to be large *Timber* Trees. They grow frequently and naturally in the Hedge-rows in *Berkſhire*, *Hertfordſhire*, and in ſeveral other *Counties*; from whence the Fruit is carried in great Abundance to other parts deſtitute thereof. It is valued by *moſt* as an excellent Fruit eaten raw, and by *all* allowed to be very *wholeſome*.

There is hardly any other way to preſerve ſome of the Fruit from the Birds, but by planting a *good number* of Trees, and then ſome will fall to the Owner's ſhare; eſpecially if the *Black-Birds* and *Thruſhes*, be a little kept in Awe with the Gun at the time of ripening. They make a well ſhaped and beautiful Tree for Avenues, and therefore ſhould be more encouraged and planted than they are; for they proſper almoſt in any Soil, but chiefly diſdain the two extremes of *Sand* and *Clay*.

They are raiſed either from the *Stones* or *Suckers*, but the *firſt* way is by much the *beſt*, *earlieſt*, and *moſt natural*; and they may be removed (with care) almoſt of any ſize. The Wood is excellent and uſeful for all or moſt of the purpoſes mentioned under the Head of the *Wild Pear*.

The Quicken, or *Quick Beam.*

THIS Plant affects the dry Places or Banks of Woods and Groves, by ſome called the *Iriſh* or *Wild Aſh*, from the reſemblance its Leaves and Bark have to the common *Aſh-Tree*. Tho' the Leaves are a little more jagged on the Edges, and ſomething ſmaller and longer in proportion to its bigneſs. It doth not bear Keys, but moſt beautiful *Scarlet* Berries in Cluſters, which look very ornamental, and make a fine ſhew at a diſtance all the Winter long: And even the Bloſſoms in the Spring have a very fragrant ſmell.

They are eaſily raiſed from theſe *Berries* or from *Suckers*; and will endure well the Severities of the Cold and *Northern* Blaſts, being a very hardy Tree, and therefore worth propagating, for the two reaſons above, for its *Beauty* and *Strength*; and alſo that it is a proper Stock for the *Service*, the *Medlar*, and the *L'Azzerole*, to be grafted upon.

It is a very *tough* Wood, and all *Heart*, therefore uſeful for the Wheelwright, and to the Husbandman for moſt of his neceſſary Tools. Mr. *Evelyn* ſays the *Berries* fermented by themſelves make an excellent Drink againſt the *Spleen* and *Scurvy*.

The White and *Black Thorn,* and *Glaſſenbury Thorn.*

THESE come into the Catalogue of the Trees of the *Foreſt*, becauſe they ſo frequently mix with them, and ſometimes come to a conſiderable Stature; tho' their uſes are otherwiſe better known, eſpecially that of the *White Thorn*, for *Mounds* and *Hedges*. The *Black Thorn*, is indeed a perfect *Weed*, running quickly over a Ground from its *Roots* and *Suckers*, and therefore is not to be encouraged any where but in Coppices as *Underwood*. But the *White Thorn*, as a Standard, mixes well enough, and anſwers very well for Lop as a Pollard, amongſt the *Foreſt-Trees*. It is raiſed from the Haws, which lie in the Ground a whole year before they peep. The Wood is *white*, *hard* and *tough*, and therefore fit for many uſes.

As to the *Glaſſenbury Thorn*, it differs from the other Thorns only in this; that as *they* bloſſom in *Summer*, *this* ſooner or later bloſſoms in *Winter*. It takes its name from the Monaſtery at *Glaſſenbury*, where it is reported it was firſt diſcovered. This Tree was many years ſince planted in *Wilton Garden* near *Sarum*, and I think it is there now. It muſt not be expected it ſhould be as exact in the *Time of bloſſoming* as it was ſuppos'd to have been at the Old Monaſtery from whence it came, *viz.* on *Chriſtmas-day*.

The Withy, Sallow, and *Ozier.*

THESE Trees are all ſo well known and ſo eaſily raiſed, that there needs very little to be ſaid concerning them. They all delight in low moiſt Grounds, eſpecially the *Ozier*: for the *Withy* and the *Sallow*, will alſo grow upon the drieſt Land. The beſt time both to tranſplant and to lop them is in *February*, juſt before the Sap begins to riſe: For they are to be raiſed of *Truncheons*, and to be kept from the rubbing of Cattle, by Buſhes ty'd about them. The Truncheons of the Withy and Sallow, ſhould be left about eight or ten foot high, and have all their Buds rubb'd off, but what may ſerve to form a Head at the top: But thoſe of the Ozier, ſhould only juſt appear with their Heads above Ground.

The Wood of the *Withy* and the *Sallow*, are very ſerviceable for the Fire in a ſcarce Country of Wood. For (as the common Saying among the Country-men is) theſe will purchaſe an *Horſe*, ſooner than an Oak will a *Saddle*. They make excellent Stakes for Hedges, where they will grow and thicken; of theſe are made *Rake* and *Scythe Handles*, *Clogs*, *Pattens*, *Hurdles*, and *Sieves*. And the *Oziers* are peculiarly ſerviceable for all ſorts of *Baskets*, *Hampers* and *Panniers*. Inſomuch that an *Ozier Ground* (for it produces a Crop every year) is reckoned of more value than the ſame quantity in Tillage. I have heard of ſome that have been let for eight or nine pounds a year *per* Acre. Which conſidering the conſtant Crop, the little Charge that attends them, the Eaſineſs of renewing the old Plants when decayed, by ſticking in pieces of the laſt years ſhoots, and withal, that they grow where almoſt nothing elſe will grow, this muſt be thought one of the *beſt* Improvements of *bad* Land.

Willow Trees.

THE *Willow* is a Tree bearing imperfect Seeds in ſingle Teguments or Coverings, and this Seed is contain'd in Catkins, call'd Juliferous Trees, and is of the longer Leaf, and of a ſoft Wood, growing moſt naturally in moiſt places; having its Leaves more denſe and compact than the *Sallow*, and being the larger Tree.

Our common *Willow* is of three kinds, the *White*, and *Black*, and *Sweet-ſcented*: The *White* is alſo of two ſorts, the one of a yellowiſh, the other of a browniſh Bark: All of them are planted of *Stakes*. The *White* delight in Meads and Ditch-ſides, rather *Dry* than over-*Wet*; yet the *Black* and *Reddiſh*, do well in more boggy Ground. When they are planted, let holes be made for them, rather than be forced in with too great violence, and they muſt be *ſoak'd* in Water two or three days before they are planted, and done in *February*, the mould being well cloſed to them.

By good Management there may be made very profitable Coppices of theſe Trees: They may be grafted betwixt the Bark, or budded, and then they become ſo beautiful as to be fit for ſome kind of delightful Walks. In low and Marſhy Places, they may be ordered ſo as in eleven or twelve years to yield a hundred Load of Wood in an Acre: It is the ſweeteſt of all our *Engliſh* Fuel, provided it be ſound and dry.

The third is the *Garden Willow*, which produces ſweet and beautiful Flowers, which may be ſet for Partitions of Squares; but they have no affinity with others: There is in *Shropſhire* another very odoriferous kind, extremly fit to be planted by pleaſant *Rivulets*, both for *Ornament* and *Profit*; it is propagated by *Cuttings* or *Layers*, and will grow in any dry Bottom, ſo it be ſhelter'd from the *South*, affording a wonderful and early Relief to the induſtrious *Bee*.

What moſt of the former kinds differ from the *Sallows*, is not much conſiderable, they being generally uſeful for the ſame purpoſes; as for *Apothecaries* and *Goldſmiths Boxes*, *Saddle-Trees*, *Gun-Stocks*, *Half-Pikes*, *Harrows*, *Shoe-makers Laſts*, *Heels for Shoes*, *Clogs*, *Forks*, *Rakes*, &c. *Perches*, *Hop-Poles*, *Supporters for Vines*, *Hurdles*, *Sieves*, *Nine-Pins*, *Tops*, *Platters*, *little Casks*, *Fruit-baskets*, *Cans*, *Trenchers*, and other *Utenſils*: The larger ſound Trees make excellent Boards for Wainſcoting, and the Boughs make good Coals; nay the freſh Boughs, (which of all the Trees yield the cooleſt ſhade in the hotteſt ſeaſon of the Day,) are fit to be plac'd about the Beds of *Feveriſh* Perſons. The Wood preſerv'd dry, will endure a long time; but what's wholly putrify'd, and reduc'd to a Loamy Earth in the hollow Trunks of ſuperannuated Trees, is of all other the fitteſt to be mingled with fine Mould, for raiſing our choiceſt Flowers, ſuch as *Anemonies*, *Ranunculus*'s, *Auricula*'s, and the like.

The

The Tamarisk.

THE *Tamarisk* is a Tree uſually planted for Variety; and is uſeful in ſome parts of Phyſick. It may be raiſed either of *Layers*, *Slips*, or *Suckers*. It grows tall like the *Cypreſs*, and will bear to be ſhorn into any handſome ſhape, eſpecially if it have a warm Shelter, for ſometimes a hard Winter kills it. It loſes its verdure in the Winter; but placed as above in ſhelter, it quickly recovers it in the Spring.

The Platanus, or *Plane Tree.*

THIS Tree, tho' of late years it hath been much neglected and little ſought for, is yet a moſt beautiful ſhade, and grows very well with us in *England*, having no other fault but that it loſes its Leaves early in the *Autumn*. The way of raiſing it is by its *Seeds* and *Layers*. This Tree was had in great eſteem and veneration amongſt the *Romans*. This Tree was firſt introduced among us by Sir. *G. Crook* of *Oxfordſhire*.

The Elder and *Medlar*, and *L'Azzerole.*

THE *Elder* loves to grow in Hedge-rows, or even under the ſhelter and dripping of other Trees in Woods, and is eaſily raiſed by Cuttings and Slips, or from the Seed, which is ripe in *September*. And from its *Black* Berries is made a very ſovereign wholeſome Wine. There is a ſort alſo that bears *White* Berries, which ſome think is *preferable* for the purpoſe aforeſaid. The early Buds of this Tree in the Spring boiled as *Watergruel*, is reckoned an excellent *Antiſcorbutick*; and it is beſides a ſovereign Plant in many Diſtempers. The young Wood of this Tree is uſeful to make Scoops for Apples; and the bigger Branches are much uſed by the Butchers for Scuers, when they cannot get Dog-wood.

The *Medlar*, tho' I have before ſpoke of it, yet I here rank amongſt the Trees of the *Wood*; becauſe the common Stock whereon it is grafted is the *White Thorn*, and it will endure any expoſition. But I know not that its *Wood* is any way peculiarly ſerviceable; and its Fruit every one knows is not good till 'tis *rotten*.

The *L'Azzerole* is, as I have alſo obſerved before, a ſort of *Medlar* brought originally from *Italy* and *Spain*; there are ſeveral ſorts of them, and they grow and bear Fruit with us very well, even amongſt other Woods of the Foreſt. The Fruit of them all has an agreeable Acidity, and therefore the *French* make their beſt Sweetmeats of them.

The

The Lotus, *The Cornel-Tree*, and the *Larch* or *Larix*.

Lotus. THE *Lotus* or *Nettle Tree*, ſo called, for that the Leaves reſemble thoſe of the Nettle, is planted chiefly for variety, having nothing remarkable, but that it affords a very fine *Shade*, and pretty durable *Timber*, planted in moiſt Ground. The Roots of it make good *Hafts* for Knives and Carpenters Tools, and the Wood of it is not leſs uſeful for Pipes and other Inſtruments.

Cornel. The *Cornel-Tree*, bears the Fruit called the Cornelian Cherry from the Reſemblance it bears to the Cornelian-Stone, in the Colour of it. It is an old faſhioned Tree; and the Fruit, tho' now out of date, was formerly much eſteemed both in the *Kitchen* and *Conſervatory*. It is raiſed both of *Seeds* and *Suckers*, and grows to a good height in almoſt any ſort of Ground. The Wood being durable is uſeful for *Wheel-work*, *Pins* and *Wedges*.

Larch. The *Larch* or *Larix* is another Tree not much known, and yet will arrive to a conſiderable Bigneſs, producing Timber that is durable and uſeful. Mr. *Evelyn* takes notice of a great many Buildings in *Italy*, made of this Wood, which he ſaith no *Worm* will touch, or ſcarcely any *Fire* burn. But *Quære*. However, from this Tree that uſeful Drug *Agaric* is gathered.

Bucks-horn Tree.

THIS is called the *Virginian Summach*; the young Branches being of a reddiſh brown, feeling like the Velvet of a Bucks-horn, and yielding Milk like the Branch of a Fig, when broken or cut. The Leaves are indented, and at the End of the Branches come forth *long*, *thick* and *brown* Tufts, made of ſoft woolly Thrums; among which appear many ſmall Flowers. It will grow in ſome places near ſix foot high: Is increaſed by *Suckers*, which it puts forth very plentifully. The Seed is flat and red, growing in Bunches or Cluſters like Grapes.

The Acacia, and *Buck-Thorn.*

THE *Acacia* is called ſo from the Reſemblance its Leaves has to the true *Acacia*, ſomething like the *Engliſh Vetch*. There are ſeveral ſorts of them in *Holland*: But we have few in *England* but what are of the *Virginian* kind, which will grow to a large Tree, and ſtand abroad without ſhelter in the Winter. Some are now growing in *Palace Yard* at *Weſtminſter*. They ſmell very fragrant, and afford a very pleaſant ſhade, which make them very acceptable to Walks and Arbours. They love a dry Soil, and are propagated from *Suckers*. Their only fault is, that the Wood is *brittle*, ſo that high Winds ſometimes a little irregularly prune them.

The *Buck-Thorn*, is a Tree that grows frequently in the Hedges; for it is raiſed and planted as the *White Thorn*, and makes a Tree of like Stature. It is deſervedly valued for its *Black Berries* in *Autumn*; the Juice whereof made into a Syrup with Sugar is thought to afford one of the beſt and ſafeſt Purges.

CHAP. II.

Of the ſeveral ſorts of Ever-Green Trees, great and ſmall, ſuch as will bear our Climate without Houſing. Firſt,

Of the Ilex.

THE *Ilex* or Ever-green *Oak*, is a Tree that deſervedly ſtands in Front of all the *Ever-Greens*, both for its Beauty and Uſefulneſs. But becauſe there have been already ſo many Miſtakes made, and ſo many Diſappointments undergone with reſpect to the Kind and Management of this Tree, I have the Pleaſure to let the World know from whence thoſe Miſtakes came, and how to prevent future Diſappointments. The Secret I had from a Friend, who was well informed thereof by a Correſpondent in *Italy*, who aſſures us, that there are *two Sorts* of *Ilex*, *viz.* the *Tree*, and the *Dwarf-Ilex*; both of them well known in *Italy*, by that diſtinction. And altho' they are exactly alike in Shape and Colour, when they are young, yet it is well known that the *Tree-Ilex*, will not eaſily be made a Dwarf, and the *Dwarf-Ilex*, can never be made a Tree, but is always intended and kept for Eſpaliers. It is the laſt of theſe whoſe Seed we commonly receive from *Italy* and *Spain*; and there have been very few of the former ſort ever yet ſent over, as imagining that we want *Eſpaliers*, and not *Timber*. Mr. *Balle* in *Devonſhire*, and ſome few others have been ſo fortunate as to light upon the large ſort, and manage even that according to the Rules of Art, by either letting them ſtand in the Seed-Plot, without a remove, or if they are remov'd, to do it with the utmoſt Care and Caution, not hurting or ſhortning the *Tap-root*: But as far as I can find, it is the general Complaint, that the *Ilex* here proves a *Dwarf-Tree*: And for what reaſon, let it be judg'd by what hath been ſaid above.

However, after ſuch a Caution as this, it is eaſie to direct that the Seed be pluck't from the large Trees, and not from Dwarfs, when a demand is made, or to get them from ſome of thoſe large Trees now in *Devonſhire*, raiſed from the Acorns, ſet in well ſifted *Loam*; and not removed if poſſible, but with all the Root and Earth about them. Thus managed and rightly choſen, it is a Tree of very quick growth, vaſtly *beautiful* and very *profitable*. There is a great deal of the *Timber* brought over every year into *England*, the Ship-Carpenters thinking it rather better and tougher than the *Engliſh Oak*. It delights in a deep Soil, rather moiſt than too dry, and is raiſed only from the Acorns, tho' I am apt to think it may well enough be grafted on a young vigorous *Engliſh* Oak. The Wood of this Tree is ſometimes finely Chamletted, as if it were painted. It is uſeful for *Chairs*, *Axle-Trees*, &c. being very hard and durable. And the Acorns are thought a Food for Hogs little inferior to *Cheſnuts*.

The Holly Tree.

THE *Holly* is a Bacciferous, Ever-green Tree, conſiderable for its Red Berries, and large, ſhining, prickly Leaves.

This Tree is preferr'd before all other *Engliſh* Winter-Greens, and Mr. *Evelyn* wonders at thoſe who are expenſive in Foreign Greens, and yet neglect the Culture of this incomparable Tree, which ought to be propagated not only for *Ornament*, but *Defence*, and divers other uſes. We have two eminent kinds of this Tree, the prickly, and ſmoother leav'd, or as ſome call it the Maiden Holly, not unwelcome when tender, to Sheep and other Cattle: There is alſo the Yellow-Berried, and the variegated Holly; which proceeds from no difference in the Species, but *accidentally*, and by ſport of Nature, or rather thro' Infirmity and Weakneſs, as moſt ſuch variegations do. And we are taught how to effect it *artificially*, by ſowing the Seeds, and planting them in gravelly Soil, mixed with ſtore of *Chalk*, and preſſing it hard down; it being certain that moſt or all of them return to their *Native Colour* when ſown in richer Mould.

The *Holly* is rais'd of the *Berries* (of which there is a ſort that bears them *Yellow*) when they are ready to drop; they muſt be freed from their tenacious and glutinous *Mucilage*, by being waſh'd, and a little bruiſed, then dried with a Cloth; or you may bury them as you do the *Yew* and *Hips*: Remove them after three or four years; and if you plant the *Setts*, place them *Northwards*, as you do *Quick*.

Of this may Incloſurers be made for Parks, &c.; and cut into ſquare Hedges, the Fence becomes impenetrable; and 'twill thrive in the *hotteſt* as well as the *coldeſt* places. You may take (tho' this way I ſhould not chuſe, but rather from *Nurſeries*) thouſands of the Setts, of four inches long, out of the Woods, and ſo plant them; but this muſt be before the Cattle begin to crop them, eſpecially Sheep, which are greedy of them when tender: Put them into the Ground in a moiſt Seaſon, Spring or *early* Autumn, but particularly the Spring; let them be ſhaded (if the Weather prove too hot and ſcorching) till they begin to ſhoot of themſelves; and in very ſharp Weather, and during our *Eaſtern* Winds, covered with dry Straw or Haume; and if any of them ſeem to be in a periſhing Condition, cut ſuch of them cloſe, and you will ſoon ſee them revive at root. The luſtier and bigger the Setts are, the better; and if you can procure ſuch as are a Thumbs-breadth thick they will ſoon furniſh a Hedge.

Mr. *Evelyn* tells us of an Hedge of this Tree, of near 300 foot in length, 9 foot high, and 5 in Diameter: He calls it an impregnable Hedge, glittering with its arm'd and varniſh'd Leaves; the taller Standards at orderly diſtances, bluſhing with their natural Coral: It mocks at the rudeſt Aſſaults of the Weather, Beaſts, or Hedge-breakers; and none unpuniſh'd can hurt it. This rare Hedge (the boaſt of the *Villa*) was planted upon a burning Gravel, expoſed to the Meridian Sun: Where undoubtedly they thrive beſt, after they have been well guarded and watered for the two firſt years.

In *Hertfordſhire*, and almoſt all over the Biſhoprick of *Durham*, and in many other Counties, theſe Trees grow naturally, even amongſt the White Thorn, and Aſhes: But if your Ground, in any ſituation, be ſtiff, you are to looſen it with a little fine gravel. *Time* muſt bring this Tree to perfection, as it does all things elſe, and we ſhould work for Poſterity: But a little Culture about the Roots, (not Dunging, which it abhors) and frequent ſtirring of the Mould, will very much add to its growth. Yet there is an expedient to effect it more inſenſibly, by planting it with *Quick*: Let every fifth or ſixth be an *Holly* Sett, which will grow up infallibly with your *Quick*, and as they begin to ſpread, make way for them by extirpating the *White-Thorn* till they quite domineer: There is alſo another, not leſs applauded method of raiſing theſe Hedges, *viz.* by laying *horizontally* well rooted Setts, (a yard or more in length) and ſtripping off their Leaves and Branches; theſe covered over with Earth, as the Poles of Hazel, *&c.* will ſend forth innumerable Suckers, which will advance into an Hedge.

The Timber of the *Holly*, (beſides that it is the *Whiteſt* of all hard Woods, and therefore uſed by the Inlayer) is for all ſturdy Uſes; the Millwright, Turner, and Engraver prefer it to any other: It makes the beſt *Handles* and *Stocks* for Tools, *Flails*, *Riding-Rods*, *Carters-Whips*; *Bowles*, &c. and of this have been made even *Hinges*, and *Hooks*, to ſerve inſtead of *Iron*. Of the Bark of this Tree is made our *Birdlime*: And the Leaves of it, dried to a fine Powder, and drank in White-Wine, is prevalent againſt the *Stone*, and cures *Fluxes*; they are alſo good againſt the *Cholick*; the Berries being ſwallow'd whole purge *Phlegm*, without danger.

The Yew or *Eugh.*

THE *Yew Tree* is a Bacciferous, Ever-green Tree, bears Red Berries, and hath ſmall narrow Leaves of a dark green.

For the ſorts of theſe Trees, I muſt be beholden to Mr. *Evelyn*, for I have yet ſeen nothing of what he tells us of the *Arcadian* Black and Red, and the Yellow of *Ida*, infinitely eſteem'd of old. Since the diſuſe of Bows the propagation of Yew is forborn; tho' to our ſhame, ſeeing the barreneſt Grounds and coldeſt of our Mountains might be profitably repleniſhed with them; for beſides the uſe of the Wood for Bows, 'tis excellent for *Cogs* of Mills, *Poſts* to be ſet in moiſt Ground, and everlaſting *Axle-Trees*: Alſo the Bodies of *Lutes*, *Theorbo's*, *Bowls*, *Wheels*, &c. are made of this Wood.

The *Engliſh* Yew Tree is eaſily produc'd of the Seeds waſh'd and cleans'd from their *Mucilage*, then buried and dried in Sand a little moiſt any time in *December*, and ſo kept in ſome Veſſel of the Houſe all Winter, and in ſome cool ſhady place abroad all the Summer; ſow them the Spring after: Some bury them in the Ground like *Haws*; it will commonly be the ſecond Winter e'er they peep, and then they riſe with their Caps on their Heads; being three years old, you may tranſplant them, and form them into *Standards* for Walks, Hedges, *&c.* in all which they ſucceed well, and are worth our patience, for their perennial Verdure and Durableneſs: For Hedges they are preferr'd for their Beauty, and being of all other Plants the moſt *tonſile*, are a ſtiff defence before any other againſt Wind and Weather.

The Yew is almoſt natural to the open Downs of *Hampſhire* and *Wiltſhire*, where they grow ſtraggling in ſingle Buſhes and to a great Bulk.

A great many of theſe Trees grow in *Surrey*; where Dr. *Moreton* bought an Eſtate call'd Yew Wood; altho' I preſume good Husbandry has greatly alter'd the Place, and made Corn grow in the room of ſuch Trees: And near *Boxhill*, as Mr. *Evelyn* ſays, if in any Spot of *England*,

'tis here
Eternal Spring and Summer all the Year.

This Plant has a matted Root, and therefore delights in a dry and light Soil, and will grow ſometimes even upon the barreneſt Rocks. In my own Glebe there is now growing a *Yew Tree* from the Clefts of the Rocks above thirty foot perpendicular from the River ſide, and by the bigneſs and gradual decay of its Body, it ſeems to be at leaſt two hundred years old. This Tree is beſt tranſplanted either early in *Autumn* or late in the *Spring*, viz. either in *Auguſt* or in *April*. It will grow of Slips apt enough for Hedges, but they will never grow tall or handſomely *Pyramidical*, which is of all others the beſt ſhape.

The Philirea and *Alaternus.*

THESE two Plants (by thoſe who are unskilful and have not nicely obſerved the difference) have often been accounted the *ſame*. But there is in many reſpects a great, real, and manifeſt difference. The Leaves of the firſt are larger and differently ſet on upon the Branch, as it were by ſteps; whereas the other hath its Leaves in an alternate order to one another, from whence probably its name *Alaternus*. Beſides, the Seeds of the *Phylirea* (from whence it is raiſed) lie a year in the Ground before they come up, but the other germinate the ſame Spring.

There are ſeveral ſorts of the *Phylirea*: The moſt beautiful, tho' the moſt tender, ſort, is the *Dutch-kind* edged with white, which if it is ſet either in Pots to be houſed in the extremeſt Froſts, or againſt a *South* Wall, makes a moſt beautiful ſhew all the year. The *bloach'd* kind mixt with *Green* and *Yellow* is an handſome Plant, and not near ſo tender as the other; but will endure, with the common ſort, to be made *Pyramids* or *Balls*, or to be planted to cover *North* Walls, for it anſwers to the Sheers very well.

The *Phylirea* is to be governed as the Holly in raiſing it from Seed; but from *Layers* and even *Slips* it may be raiſed, and the gilded kinds may be put into the common ſort by *Inoculation*. It delights in a light unmixt Soil inclining to Loam; for *there* it will thrive apace, and make excellent Hedges, Paliſadoes, and Arbours.

The *Alaternus* requires much the ſame Management and Soil as the *Phylirea*. It is a quick Grower, and will form a fine Hedge, planted in ſingle Rows two foot aſunder, even to twenty foot high, if it have but ſome additional ſupport againſt the fury of the Winds. Or it may be uſed for Ornament in Pyramids or Balls in Compartments.

The Box.

THERE are reckoned to be three or four ſorts of Box. One ſort runs up to Wood, and will make Timber and a conſiderable Tree, called therefore *Buxus Arboreſcens.* The ſecond is called the *Shrub Box*, and this is ſometimes variegated and ſtrip'd with *Yellow.* And the third is the *Dwarf Box*, ſo well known for its ſingular uſe and beauty for Edgings; of all others the moſt durable and eaſieſt kept in order.

The *Box Tree* deſerves to be cultivated for the excellency and uſefulneſs of its Wood, and alſo becauſe it will proſper on the Declivity of *cold*, *dry*, *barren*, and *chalky* Hills, where nothing elſe will grow. Mr. *Liger* rightly judges the *large Box* to be of no uſe in Gardens, altho' Mr *Bradley* thinks it makes *delightful* Hedges. However, the Taſte of the preſent Age hath well nigh baniſhed it from the Garden; and that with a good deal of Reaſon, on the account of its ſtrong and diſagreeable ſmell; eſpecially after *clipping.* But as every thing hath, or ſhould have its proper Place, ſo this Tree ſhould find Encouragement at an humble diſtance from the Houſe, for the Value and great Price ſet upon its Wood; which is thought to be the *hardeſt* and *heavieſt* of all *Engliſh* Growth, and therefore is eagerly ſought for by the *Turner* and *Engraver*; by the *latter* eſpecially for all ſorts of Mathematical Inſtruments. This Tree will thrive in almoſt all Soils, and (as I have already obſerved) in ſome of the *worſt.* It is ſomething tedious to raiſe it from the Seed: But it will grow with great facility from *Slips* or *Layers* in the Nurſery. And every little Branch of the *Dwarf* ſort will eaſily anſwer this way.

The Cork-Tree.

THE *Cork-Tree* with us, is of two Sorts. The one hath a narrower and leſs jagged Leaf than the other, keeping its Leaves green all the Winter; but the Leaves of the other are broader and fall in the Winter. The *latter* ſort is ſomewhat the hardieſt; but they will both well enough endure our Climate and Winters. There are ſeveral of them of late years planted in ſeveral parts of *England*; at my Lord *Pembroke*'s in *Wilton* Garden, there is one of a conſiderable Bigneſs, whoſe Bark plainly diſcovers the nature of the *Cork.* It hath *three* Barks when it is full grown, the outermoſt whereof is the *Cork*, which, in the *Weſt Indies*, they ſtrip once in two or three years in a dry ſeaſon; becauſe the Wet is apt to prejudice the Tree. And one of the other Coats being *Red*, bears a good price with the Tanner. I cannot learn that the Wood of the Tree is of any particular ſervice. It is to be raiſed from *Suckers* or *Layers.* Mr. *Evelyn* remarks, that the *Grecian* Ladies made uſe of the outward Cortex for Soles to their Shooes, and from thence were called *light-footed.*

Juniper

Juniper Tree.

THE *Juniper* is a Bacciferous, Sempervirent Shrub, whoſe Leaves are entire, of ſmooth edges, and diſtinguiſh'd by the Leaf, which is ſmall, ſlender, and prickly at the end, being odorate; and both the Leaves and Wood are of a pleaſant Scent, producing *Bluiſh* Berries, from whence the Tree may be raiſed.

Mr. *Evelyn* tells us of three ſorts; the *Male*, the *Female*, and *Dwarf*; whereof one is much taller, and more fit for Improvement than the others: And there is yet a fourth, called the *Swediſh Juniper*, of a much paler and handſomer Green, and therefore more ſought for than the *Engliſh*. The Wood is *Yellow*, and being cut in *March*, ſweet as *Cedar*, whereof it is by ſome accounted a ſpurious kind; all of them difficult to remove with ſucceſs; nor will they proſper being much ſhaded, or over-dripp'd. He has rais'd them abundantly of their Seeds, (neither watering nor dunging the Soil) which in two Months will peep, and being govern'd like the *Cypreſs*, apt for all the Employments of that beautiful Tree: To make it grow tall, prune and cleanſe it to the very Stem; the *Male* is beſt. The diſcreet looſening of the Earth, about the Roots, makes it ſuddenly ſpread into a Buſh, fit for a thouſand pretty uſes, for it comes to be much unlike that which grows wild, and it may be formed into moſt beautiful and uſeful *Hedges* and *Arbours*.

Out of one Tree *Arbours* may be made for ſeveral Perſons to ſit in: At *Woodcut* in *Surrey*, there was an Arbour made of a *Juniper Tree*, which meaſured ſeven foot Square, and eleven in Height; and would certainly have been of a much greater Altitude, and farther ſpreading, had it not been continually kept ſhorn: And what is the moſt conſiderable, it was then hardly ten years ſince it was brought out of the Common a ſlender Buſh, of about two foot high. At *Ebiſham* in *Surrey* are alſo exceeding fine *Juniper* Hedges.

Mr. *Evelyn* experimented a proportionable Improvement in his own Garden, where he mingled them with *Cypreſs*, and found they perfectly became their ſtations, where they might enjoy the Sun: They may be properly ſet where *Cypreſs* does not ſo well thrive, *viz.* in ſuch Gardens and Courts as are open to the Eddy Winds, which indeed a little diſcolour our *Junipers* when they blow *Eaſterly* towards the Spring, but they conſtantly recover again; and beſide, the Shrub is *tonſile*, and may be put into any ſhape.

The Berries of the *Juniper* afford (beſides a tolerable Pepper) one of the moſt univerſal Remedies in the World; for being ſwallow'd *whole*, they ſeldom fail to appeaſe the Wind Cholick; in a Decoction they are moſt ſovereign againſt inveterate *Coughs*; and the Water is an excellent *Specifick* againſt the *Gravel*: But all is comprehended in the virtue of an Electuary made of it, which is good againſt the Stone, Rheums, Dropſy, Jaundice, inward Impoſthumes, Palſy, Gout, and the Plague.

The Timber of this Wood is fit for many curious Works; for *Tables*, *Cheſts*, *Carvings*, *Spoons*, &c. and the very *Chips* render a wholeſome Perfume *within* Doors, as well as the duſty Bloſſoms in Spring *without*.

The Laurel; Engliſh, Alexandrian, *and* Cherry.

THE *Laurel* is an old faſhioned and now much neglected Tree; for it is neither fit for Hedges nor Pyramids, the Sheers not at all agreeing with it, on the account of its large Leaves, which look very aukward and unnatural when they happen (as it muſt ſo happen) to be cut in halves. If it hath any Beauty or Excellence, it is when 'tis wholly neglected in Standards, or when planted againſt *North* Walls, where they may be only a little tack'd to, and ſo left to Nature, its ſhining verdant Green not looking amiſs. It is to be raiſed from the *Berries* or from *Suckers* which it puts forth very plentifully, and may be inoculated on the *Black Cherry*, *Plum* or *Aprecot*; which is a certain indication that both *Leaves* and *Fruit* partake nothing of the Nature of the Juices of the Stock, but are altogether formed from the Nature of the Cyon, and the Figure of its Veſſels and Ducts. There is a ſort of it prettily bloach'd with white in the middle of the Leaves; which adds much to its Beauty.

The *Alexandrian Laurel* makes ſhoots about three foot high, which are flexible, and adorned with oblong ſharp-pointed Leaves, of a fine green colour, but ſmaller than the common *Laurel*. From the middle of theſe Leaves ariſe others of much the ſame ſhape, which form a ſort of *Tongue*, and from the top of theſe Branches grow the Flowers. The ſame Ground and Culture doth for this as for the *Common Laurel*.

There is alſo a *Cherry Laurel*, ſo called from the Largeneſs of its Fruit, being as big as a *Cherry*. This is alſo propagated from the Root and loves the Shade, or may be inoculated on the Cherry. It endures the hardeſt Winters, will do well for either Hedges or Standards, and ſo ſerves either for the Garden, or for Groves and Wilderneſſes. They are an *Ever-green*, brighter and ſofter to the touch than the *common Laurel*.

Cypreſs Trees.

THE *Cypreſs* is alſo a Coniferous Ever-green Tree, whoſe Cones are roundiſh, of the leſſer ſort, having ſhort Leaves, which naturally grow in a *Conical* Figure.

It is therefore a beautiful Tree, and was within a few years paſt reputed ſo tender and nice a Plant, that it was cultivated with the greateſt care, and to be found only amongſt the *Curious*; whereas we ſee it now in many Gardens, riſing to as goodly a Bulk and Stature as moſt are in *Italy*; for ſuch were in the Gardens of King *Charles* the Firſt at *Theobalds*, before that Princely Seat was demoliſh'd.

We had our firſt *Mirtils* out of *Greçce*, and *Cypreſs* from *Crete*; and we have in *England* three ſorts of *Cypreſs* Trees, which are all of them eaſily propagated, and proſper very well, if they are rightly ordered. The Tradition is, that the *Cypreſs* is never to be cut, for fear of killing it; but there is not a more *tonſile* and governable Plant in Nature; for it may be cut to the very Roots, and yet ſpring afreſh: The *Cypreſs* being raiſed from the Nurſery of Seeds, ſown in *September* (or rather *March*) and within two years after tranſplanted, ſhould at two years ſtanding more, have the *Maſter Stem* of the middle Shaft cut off ſome hand-breadth below the Summit, the ſides and ſmaller ſprigs ſhorn into a *Conique* or *Pyramidal* Form, and ſo kept clipt from *April* to *Auguſt*, as often as there is occaſion; and by this management they will grow furniſh'd to the Foot, and become the moſt beautiful Trees in the World, without binding or ſtake: Which makes them but rot and mould within; ſtill remembring to abate the *middle Stem*, and to bring the *collateral* Branches in its ſtead to what altitude you pleaſe; but by *ſhortning* the middle ſhoot is not meant the *dwarfing* of it, and therefore it muſt be done *diſcreetly*, ſo as it may not over-haſtily advance, till the foot thereof be perfectly furniſhed.

Another way of dreſſing this Tree, with all the former Advantages, is by ſparing the *ſhaft* altogether, and diligently cutting away all the *forked* branches, reſerving only ſuch as *radiate* directly from the Body, which being ſhorn and clipt in due ſeaſon, will render the Tree very beautiful; and though it be more ſubject to obey the ſhaking *Winds*, yet the natural *Spring* of it, does immediately redreſs the Injury, without the leaſt diſcompoſure. Thus alſo may you form them into Hedges and Walks; or by ſowing the Seeds in a ſhallow Furrow, and plucking up thoſe that come too cloſe and thick: For in this Work, it will ſuffice to leave them within a foot of each other; and when they are riſen about a yard high (which may be to half of your Paliſado) cut off their Tops, as you are taught, and keep the ſides clipp'd, that they aſcend by degrees, and thicken at the bottom as they climb up. Thus they will preſent you, in ſix or eight years, with incomparable Hedges, preferable to all others, becauſe they are perpetually green, and able to reſiſt the Winds better than any, the *Holly* excepted, which has no equal. By *Winds* are meant their fierceſt *Guſts*, not their *Cold*; for our cruel *Eaſtern* Winds do ſometimes mortally invade *them* which have been left clipp'd, but ſeldom the untouch'd or thoſe that were dreſs'd in the Spring only.

The Froſt of the ſevereſt Winters, till it joins forces with deſtructive Winds, never does any conſiderable damage to theſe Trees, unleſs they have been clipp'd late in the *Autumn*; neither will they then affect them, if cloathed with a Wiſp of Hay or Straw to ſecure them from the Winds; and the Froſts only diſcolour them, but ſeldom or never hurt them. If they are not thus cloathed, or capp'd, when they are late cut to the quick, (as the latter end of *October*) and are raw of their wounds, they are ſubject to take cold, and *gangreen*, and at length *die*.

If you affect to ſee the *Cypreſs* in *Standard*, and grow wild (which in time may arrive to be of large ſubſtance, plant of the reputed *Male ſort*; it is a Tree which will proſper wonderfully; and it is of this Timber that the *Venetians* make their greateſt Profit. There is likewiſe the *Tarentine Cypreſs*, ſo much celebrated by *Cato*; and both that and the *Mileſian*, are worthy of Culture.

Beſide raiſing from the Seed, (as aforementioned) the Ancients, who were wont to make great Plantations of them for Timber, had another Method, which has here been practiſed: If you receive your Seed in the Nuts, which uſes to be gathered thrice a year (but ſeldom ripening within) expoſe them to the Sun till they gape, or near a gentle Fire, or put them in warm Water, by which means the Seeds will eaſily be ſhaken out; for if you have them opened before, they do not yield you half their Crop: About the beginning of *April*, or before, (if ſhowry Weather) prepare an even Bed of fine Earth, and clap it down as Gardiners do with their Spades for Purſelain Seed; upon this ſtrew your Seeds pretty thick, then ſift over them ſome more Mould, more than half an Inch thick; keep them duly watered after Sun-ſet, unleſs the Seaſon do it for you; and after one years growth, you may tranſplant them as you pleaſe. In watering theſe, and moſt tender and delicate Seeds, 'tis better to dew them with a Broom or Spergitory, than hazard the beating them out with the common Watering Pot; and when they are well come up, be but *ſparing* of Water.

Be ſure to cleanſe your Trees, when the Weeds are very young, leſt you eradicate your *Cypreſs*: and if well watered, they will make a prodigious advance. They thrive beſt in our ſandy, light, and warmeſt Grounds; but in low, and Mooriſh places, ſtiff and cold Earth, &c. they never proſper. When that long and incomparable Walk of *Cypreſs* at *Fraſcati* near *Rome*, was firſt planted, they drew a *ſmall Stream* by the foot of it, and made it arrive (as reported) to ſeven or eight Foot height in one Year.

The *Venetians* ſufficiently underſtand the uſes of this Timber for *Cheſts*, *Harps*, and other *Muſical* Inſtruments; for it reſiſts the *Worm* and *Moth*, and all Putrefaction, and is alſo very *ſonorous*, and therefore employ'd for *Organ Pipes*. At *Venice* were to be ſeen Planks of above four foot in breadth, of this Timber; and the *Valves* or Gates of St. *Peter*'s Church at *Rome* were made of this Material, which laſted from the Time of the *Great Conſtantine* to *Pope Eugenius* the Fourth's time, almoſt ſix hundred Years, and were then as freſh and entire as if they had been new; but this Pope would needs change them for Gates of Braſs. *Thucydides* tells us, that the *Athenians* uſed to bury their Heroes in *Cypreſs Coffins*, and many of the *Mummy* Cheſts brought from *Ægypt* with thoſe condited Bodies are of this Wood, which probably may have lain in thoſe dry and ſandy *Crypta* many thouſand Years.

The laſting Bridge built over the *Euphrates* by *Semiramis* was hereof: And it is reported pleaſantly, that *Plato* choſe this Wood to write his Laws in, before *Braſs*, for its *Diuturnity*. The People of *Crete* and *Malta* build with this Timber, becauſe they have plenty of it, and nothing outlaſts it or can be more beautiful. Divers will have this to be the *Gophir* Wood, mentioned in the Scripture: It is commended for the improvement of the Air, and *ſpecifick* for the Lungs, as ſending forth moſt ſweet and *Aromatick* Emiſſions, when clipp'd or handled; and the Chips and Cones being burnt, extinguiſh *Moths* and expel *Gnats* and *Flies*: The Chips alſo give flavour to Muſcadines and other rich Wines. This Wood likewiſe yields a very good Gum, not much inferior to Turpentine.

Mr. *Mortimer* tells us of a Friend of his in *Barbadoes*, who cut down one of theſe Trees there, which had above four hundred foot of Timber in it. And that there were others ſtill of greater Magnitude.

Fir Trees.

THE *Fir* or *Deal*, is a *Coniferous*, Ever-green Tree, whoſe Cones are of the leſſer ſort, having long Leaves; either that whoſe Leaves encompaſs and cover the Branches, bearing long Cones hanging downwards, as the *Male Fir* Tree or *Pitch Tree*; or that whoſe Leaves grow from each ſide of the ſtalk, being more flat like thoſe of the Yew, *Green* on the upper ſide, and *Whitiſh* underneath, *furcated* at the end, bearing Cones ſhorter and thicker, and growing erect as the *Female Fir* Tree. The firſt of theſe is called the *Scotch*, the other the *Norway* or *Spruce* Fir, which anſwers much better to the Sheers than the other.

This Tree is eaſily rais'd of the Kernels, which may be gotten out of their Cones by expoſing them a little before the Fire, or in warm Water till they begin to gape. The Seeds may be ſown in Beds or Caſes in *March*, and when they peep they are to be carefully preſerv'd with Furzes or the like Fence from Birds: The Beds ſhould be made in a ſhelter'd place, and the Seed ſown not above half an inch deep in ſhallow Rills, and covered with fine rich Mould: When they are not up a Finger high, ſtrengthen their Stalks by ſifting ſome more Earth about them: When they are two or three years old you may tranſplant them, and after three or four years, when well rooted, they make prodigious ſhoots.

Firs will grow in moiſt Clays or barren Gravel, and even in poor Ground if not over light and ſandy: Before ſowing the Seed, turn it up a foot deep, ſowing or ſetting your Seeds a hand diſtance, and riddle Earth on them: In five or ſix Weeks they will peep: When you tranſplant, water them well before, and cut the Clod out about the Root, which knead cloſe to them: Thus they may be ſafely ſent many Miles, but the tops muſt neither be *bruiſed* nor *cut*, which would *dwarf* them, and make them ill ſhaped for ever after.

The beſt time to tranſplant theſe Trees is in the beginning of *April*; and they will thrive mainly if tranſplanted into a ſtiff hungry *Clay*, or rather *Loam*, and not a *rich* Soil: If your Ground be improper, fill the holes with ſuch barren Earth, and if the *Clay* be too ſtiff, with a little *Sand*, removing them with as much Earth about the Roots as is poſſible: If through neceſſity you plant towards the latter end of Summer, lay a pretty deal of Horſe-Litter upon the Surface of the Ground to keep off the *Heat*, and in Winter the *Cold*; but let no Dung touch the Stem or Root. You may likewiſe ſow in ſuch Earth about *February*, they will ſhoot the firſt year an inch, the next an handful, the third three foot, and thence forward above a yard annually, except a very dry Year overtake, and that will diſcover a manifeſt Difference. The Facility of their Propagation, their affecting Places where little elſe will thrive, their *Uniformity* and *Beauty*, their perpetual *Verdure*, Sweetneſs, and Fruitfulneſs, affording *Seeds*, *Gum*, *Fuel* and *Timber*, of all other Wood the moſt uſeful and eaſy to work, *&c.* all theſe Qualities render them highly worthy of Recommendation as an excellent Improvement of Husbandry, fit to be enjoin'd by ſome Law or Statute, to the Inhabitants of this Iſland, that we might have Maſts for Shipping, and thoſe other

Materials of our own Production, without being oblig'd to other Nations.

Fir is of extreme great uſe: It makes our beſt *Maſts* for Shipping, *Sheathing*, *Scaffold Poles*, &c. (heretofore the whole Veſſel); and tho' *Fir* rots quickly in *ſalt* Water, it does not ſo ſoon in *freſh*; nor is it refus'd in Merchant Ships, eſpecially the upper parts, becauſe of its lightneſs: It is alſo uſeful in Wainſcot, Floors, Pales, Boxes and Bellies for all Muſical Inſtruments. It is exceeding ſmooth to poliſh on, and therefore does well under gilding; and takes Black equally with the *Pear Tree*: *Fir* does well in Carvings, as for *Capitols*, *Feſtoons*, *Statues*, &c. eſpecially being gilded, becauſe of the eaſineſs of the Grain to work: and it takes the *Tool* every way. That famous Image of the *Bleſſed Virgin* at *Loretto* (ſaid to be carved by St. *Luke*) was made of *Fir*.

The Heart of *Deal* is almoſt *everlaſting* if kept dry, and no Wood agrees with *Glew* like it. Whole Towns and Cities are built of this Wood, in the *Northern* Parts of the World, as *Moſcow*, *&c.* and *Tholouſe* in *France* was within not much more than an hundred years moſt of *Fir*. Moſt of *Venice* and *Amſterdam*, is built upon them: And they make excellent *Piles* to ſuperſtruct on in boggy Grounds. In former times they made *Carts* and *Coaches* of this Wood.

The reſinous Tops of *Fir* and *Pines* are a ſovereign Remedy in *Scorbutick* Deſeaſes, *Gravel* in the Kidneys, *&c.* and the Chips or Shavings of *Deal* Boards, beſides kindling of Fires, are uſeful to keep Drink inſtead of *Hops*.

The *Fir*, and moſt *coniferous* Trees, yield the ſame Concretes, *Turpentine*, *Roſins*, *Pitch* and *Tar*, &c. as the *Pitch Tree* or *Pine*. But Mr. *Evelyn* diſlikes tranſplanting of *Firs*, becauſe for want of Tap-roots (eſpecially if ſet cloſe or in Tufts) they are in danger of being deſtroy'd by Winds: therefore they do beſt in Walks at competent diſtances. The Rule is, *Woods ſhould be ſowed, and not remov'd.*

There is a *Silver Fir*, which Mr. *Evelyn* names *Spaniſh*, which is ſtill a more beautiful Tree than either of the two former, by reaſon of its Silver Colour on the inſide of the Leaves; but whether it is better than either of the former for uſe is ſtill uncertain.

The Pine Trees, &c.

PITCH and *Tar* are moſtly made, in *New-England*, from the *Pine*, which naturally yieldeth *Turpentine*, at firſt flowing, liquid and clear, but being hardened by the Air, is not much unlike the *Burgundy Pitch*; and in that Country they are call'd *Pitch Pines* out of which this gummy Subſtance tranſudes: They grow upon the moſt barren Plains, and on Rocks, and Hills riſing amongſt thoſe Plains, where ſeveral are found blown down, that have lain ſo long, as that the whole Trees being periſhed, ſome certain Knots of the Boughs have remained entire, lying at the ſame diſtance and poſture as they grew upon the Tree, for its whole length: The Bodies of ſome of theſe Trees are not corrupted by Age, and when reduc'd to Aſhes by Fire, it hath no power over theſe hard Knots, beyond a black ſcorching; tho' on heaps they are apt to burn.

Of theſe Knots they make their *Tar* in *New-England* and the Country adjacent, while they are well impregnated with that *Terebinthine* and *Reſinous* matter, which like a Balſam preſerves them ſo long from Petrefaction. The reſt of the Tree contains the like *Terebinthine* Sap, as appears from Inciſion, by a ſmall Chriſtalline Pearl, which ſweats out; but this being more watery and undigeſted, renders the Tree more obnoxious, eſpecially if it lies proſtrate with the Bark on, which is a Receptacle for a certain Worm that haſtens its decay.

The Knots alone, the Tar-makers amaſs in heaps, carrying them in Carts to ſome place, where finding Clay or Loam fit for their turn, they lay an Hearth of ſuch ordinary Stone as they have at hand: This they build ſo high from the Level of the Ground, that a Veſſel may ſtand a little lower than the Hearth, to receive the Tar as it runs out. The Hearth is made wide according to the quantity of Knots to be ſet at once, and with a ſmooth Floor of Clay, yet ſomewhat deſcending from the extreme parts to the middle, and thence towards one of the ſides, where a *Gullet* is left for the Tar to run out at.

When the Hearth is thus finiſh'd, they pile the Knots one upon another, as our *Colliers* do their Wood for Charcoal, and of a height proportionable to the breadth of the Hearth, and then cover them over with a Coat of *Loam* or *Clay*, which is beſt, and in defect of them, with the beſt and moſt tenacious Earth the Place will afford; leaving only a ſmall Spiracle at the top, whereat to put the Fire in, and making ſome little holes round about at ſeveral heights, for the admiſſion of ſo much Air as is requiſite to keep it burning, and to regulate the Fire by opening and ſtopping it at pleaſure. The Proceſs is the ſame almoſt with that of making *Charcoal*; for when it is well on Fire, the hole at top is ſtopped, and the Regiſters ſo govern'd, as the Knots may keep burning, and not be ſuffocated with too much Smoke; whilſt all being now thorough heated, the Tar runs down to the Hearth, together with ſome of the more watery Sap, which haſting from all parts towards the middle, is convey'd by the aforementioned Gutter into the Veſſel plac'd to receive it.

The *Tar* being all melted and run out, they ſtop all the Vents very cloſe, and find the Knots made into excellent *Charcoal*, preferr'd by the Smiths before any other made of Wood; and in defect of *Sea-Coal* they chuſe this, and give greater Prices for it. From theſe Knots alſo the Planters ſplit ſmall *Slivers*, about the thickneſs of ones Finger, which burn inſtead of Candles, giving a very good Light: This they call *Candle-wood*, and is much in uſe in *New-England*, &c. The Knots are not to be ſeparated, only by time; neither are they the only Materials from whence *Tar* can be extracted; for there are many other Trees abounding with the ſame ſort of Knots, and full of *Turpentine* to make *Tar*: but the felling and cutting out the Knots, would exceed the value of the *Tar*; whereas the Knots above deſcribed are gotten only by gathering. Sometimes Trees are found, the loweſt part of whoſe Stems towards the Root, is as full of *Turpentine* as the Knots; of theſe alſo may Tar be made, but ſuch being rare, are commonly preſerv'd to ſplit into *Candle-wood*, becauſe they eaſily rive into any Lengths and Scantlings, much better than the Knots.

The whole Art of *Tar-making*, is but a kind of rude Diſtillation *per deſcenſum*; and might be as well done in Furnaces of large Capacity, were it worth while. Of *Tar*, by boiling it to a ſufficient height, is *Pitch* made; and in ſome places where *Roſin* is plentiful, a fit proportion of that may be diſſolv'd in the Tar, while it is boiling, and this is ſooneſt converted to *Pitch*, but 'tis ſomething different from what is made of *Tar* only. Some Perſons, to bring their *Tar* into *Pitch* for a ſudden uſe, make the *Tar* ſo hot in an Iron Kettle, that 'twill eaſily take Fire, and when blazing, ſet it in an Airy Place to burn, till it appears of a ſufficient conſiſtence, then by covering the Kettle cloſe the Fire is extinguiſh'd, and the *Pitch* is made without any more Ceremony.

Five Leagues from *Marſeilles* are very high Mountains, for the moſt part covered with Foreſts of *Pine-Trees*, which grow wild; and here you ſee the making of *Pitch*, *Tar*, *Roſin*, and *Turpentine* thus: In the Spring when the Sap runs moſt, they pare off the Bark of the *Pine*, to make the Sap run down to the hole, which they cut at the bottom to receive it; as it runs it leaves a *Cream* or *Cruſt* behind it, which they take and temper in Water, and vend for *White Bees-Wax* (tho' it is not ſo) that they make *Flambeaux* of; then they take up the Juice in Spoons from the bottom, and when they have a good quantity, they ſtrain it through ſuch a Basket as Grocers put *Malaga* Raiſins in; what runs through eaſily is the common *Turpentine*, what remains they diſtil in an Alembick with a ſufficient quantity of Water, and what comes over is *Oyl of Turpentine*, and the *Calx* remaining is common *Roſin*: Then they cut the Stock of the Tree into large *Chips*, and pile them hollow in a Cave, covering it on the Top with Tiles, but ſo as to let ſome Air come in to feed the Fire, and then burning them, there runs a thick Juice to the bottom, where they make a ſmall hole for it to run out at, and that which ſo runs is *Tar*: Then boiling it gently to conſume more of the moiſture, they ſet it to cool, which when cold is *Pitch*.

The great uſe of *Pitch* and *Tar*, in our Shipping and Navigation, is ſufficient to make this ſhort Account of their *making* it acceptable; eſpecially as the *Fir* (a Tree of our own natural Product) furniſhes us with like Materials for *Pitch*, *Tar*, *Turpentine*, &c.

Turpentine is us'd in many Medicines; as is likewiſe *Pitch* for Ointments, &c. and from the burning and fuliginous Vapours of theſe, eſpecially the *Roſin*, we have our *Lamp* and *Printers* Black.

'Tis thought that the *Pine* and *Fir* Trees in *Scotland* might yield His Majeſty Plenty of excellent *Tar*.

The Cultivation of all the ſeveral ſorts of the *Pines* is much after the manner of the *Fir*, to which Head I refer the Reader; but it ſhould be taken notice of here, that there are many ſorts of Pines, and the Tree hath the different Sexes of *Male* and *Female*; for the *Male* is generally lower and more knotty than the *Female*: That ſort called the *Picca* affects cold Ground and proſpers well in *England*, and ſo doth the *Pineaſter* or wild ſort, out of which is extracted great ſtore of *Pitch*. And we are told of another Sort called the *Peda*, which grows in *Dalmatia*, and is ſo *unctuous* that it will ſlit into *Candles*.

Arbor Vitæ.

THE *Arbor* or *Lignum Vitæ* is a curious *Ever-green*; and if it likes the Soil, which ſhould be *Loamy*, will grow to a great height and make handſome *Timber*. It alſo makes beautiful Standards for *Pyramids* and *Balls* to adorn the *Parterres*; for it bears the Sheers very well, and is therefore alſo good for *Hedges* and *Arbors*. The ſmell of the Leaves is *Aromatic*; offenſive to ſome, and pleaſing to others. It is thought when rubb'd between the Fingers, to ſmell like *Cheſhire Cheeſe*. Whether it be from this ſtrong ſmell or any other virtue in the Leaves, I know not; but 'tis an excellent *Specific* for an *Ague* when rubb'd or bruiſed with a *rolling Pin*, and afterwards apply'd to the *Wriſts* and *Soles* of the Feet, where it ſhould continue ſeveral days ty'd on. I have ſeldom known it fail of a Cure, eſpecially among Children, except in very ſtubborn and extraordinary Caſes.

It is hardy, and very natural to our Climate, which makes me wonder it is not more cultivated; eſpecially conſidering it is eaſily raiſed either from *Layers* or *Slips*, and is of all others incomparably the *beſt* for the Turners uſe; the Wood being ſmooth and compact, and prettily *veined*; which makes the *Boxes*, *Bowles*, *Cups*, and other *Curioſities* made of this Wood much ſought after and deſired.

The *Leaf* of this Tree is likewiſe thought to make one of the beſt Oyntments for green Wounds, for healing them ſuddenly.

Ivy ſtrip'd and plain.

THE *plain Ivy*, is an old faſhioned Green, of late years much neglected and deſpiſed; chiefly becauſe being a Climber and not able to ſupport it ſelf, it hath been found to injure the Buildings againſt which it is ſet; foraſmuch as it eats out the Mortar from between the Joints of the Stone, with its natural Claws, which find and ſearch every paſſage. Neither its Bloſſoms nor black Berries are very beautiful; but its Leaves are of a fine ſhining Green all the year; which chiefly gave it its former Reputation. But there is a *ſtrip'd ſort*, edged with Silver, which looks very beautiful, and very agreeably covers a *North* Wall made with Brick, where it can do but little harm with its Claws. Beſides, tho' it hath been thought to be ſuch a Climber as would not grow without a ſupport, yet Experience and Practice teaches, that it may be made a Dwarf Standard with its ſtrip't Head cut into round Balls, than which nothing more pleaſes the Eye, nothing better endures the Cold, and nothing is of late more ſought for among the hardy Ever-greens. It may be propagated either from *Suckers* or *Layers*.

Savine.

SAVINE or *Sabin* is a dwarfiſh Ever-green, not much unlike to the *Engliſh Juniper*. It bears clipping, and is therefore fit either for Hedges or Standards cut into Form. A Decoction of the Branches of this Tree is an exceſſive Bitter, and effectually cures the Worms: It is uſually raiſed from *Layers* and *Cuttings*.

Pyracantha.

THIS is a *Thorny Shrub*, ſhooting out ſeveral Branches which bear Leaves like thoſe of a *Wild Pear*, of a dark green colour all the year. This Plant hath many Excellencies, which other *Greens* of the *Parterre* want; and yet (for what reaſon I know not) it doth not meet with that encouragement it deſerves. For beſides the Beauty of its green Leaves, and the Bunches of Flowers it puts forth in *May*, it bears Cluſters of *Berries* of ſuch a bright Scarlet, as dazzle the Eye; which commonly hang on the Tree all the Winter till *Spring*; if the Birds will let them alone, for they are greedy of them in hard Weather.

The ſtrong, frequent, and prickly *Thorns* it puts forth, occaſions the Tradition, that this was the Tree, of which our Saviour's *Crown of Thorns* was made, from hence by ſome this is called the *Holy Thorn*; growing, as it is ſaid, frequently in *Judea*. It may be trained into Balls and Pyramids, but then a great deal of its Beauty is loſt when it grows *ſtubbed* and *woody*; and beſides, the *Flowers* and *Berries* always grow on the Wood of the laſt year, which in cloſe clipping, is chiefly removed; and therefore the beſt way of managing this Tree in perfection and beauty, is to plant it againſt the *North* Sides of the Houſe or other Buildings, where it may have Room to ſpread: For chiefly on the *horizontal* Branches will it diſplay its beauty in *Flowers* and *Scarlet Berries*.

As to the *Culture* of this beautiful Plant, it is raiſed either from the *Berries*, or from *Layers* and *Suckers*. In the firſt way the Seeds muſt be ordered as thoſe of the *Holly*; but I think the giving them firſt to Fowls to paſs through their Bodies, is a little too *fanciful*: It may ſuffice only to lay them in heaps in ſome by-place for one year, and ſow them the next. In the other way from *Layers* and *Suckers*, care ſhould be taken that they be not too long out of the Ground, having commonly but few and weak Fibres. It delights in a mixt loamy Soil, hating either *Clay* or *Sand*, much more any Dung or Manure.

Celaſtrus, and *Arbutus*.

THE *Celaſtrus* or *Staff-Tree* is but little regarded and taken notice of, yet it is but juſt to let it have its place in a complete Collection; it bears green Leaves all the Winter, and ſome mix it with the *Pyracantha* to make the Ever-green Hedges. It is raiſed of Seed and Layers, and removed in the Spring.

The *Arbutus* or *Strawberry Tree*, fills a place amongſt the Ever-greens very agreeably. It is indeed an *Exotic*, and hath been uſed very tenderly (as many others have, that need it not) but it is by experience found to thrive very well amongſt our *Engliſh* Greens, tho' more *commonly*, and ſome think more *naturally*, in *Ireland*. There are ſome very large Trees of it in the Gardens about *London*, which bear *Flowers*, *Fruit* and *Seed*, to perfection. It holds its Leaves on all the Winter, which are of a bright ſhining *Green*, much reſembling the Bay, only more *indented*, and the young Shoots are a little *reddiſh*. In ſhort, it is one of the moſt beautiful Plants, not variegated, we have. It is ſomething difficult both to *raiſe* and to *remove*. The beſt way is from the Seed, which is contained in the Fruit like a *Strawberry*, and of no unpleaſant taſte when it is ripe about *Chriſtmas*. The *Seed* ſhould be ſown in a Box of light Earth in the Spring, and carefully covered, to the thickneſs of a Crown-piece, with ſifted Mould. The gentle heat of a *Hot Bed* will accelerate its Germination, and increaſe its Stature; but I am ſtill of the mind, that for Health and long Life, *Nature*'s and the *Carrier*'s Pace is beſt: If you can find a way to *lay* ſome of its tender Branches, let it be done in fine Earth about *September*, and in a year's time, (if it be a dripping Summer, or that it have frequent waterings) it will have got ſtrength enough to be tranſplanted in the following Spring, but yet with great care and caution. It cares not much for the *Sheers*, and indeed doth not much want them, being diſpoſed to grow into good ſhape. Where there is plenty, ſome will make Hedges of them, but they appear in their greateſt Beauty in the *Wilderneſs Works*. It avoids *Clay*, and delights chiefly in a rich *Gravel* or *Sand*; where it will moſt commonly bloſſom twice a year.

Cedar Trees.

CEDAR is a Coniferous Ever-green Tree, large and tall, and bearing great roundiſh *Cones* of ſmooth Scales, ſtanding upwards, the Leaves being *ſmall*, *narrow*, and *thick ſet* together.

There are ſeveral ſorts of this Tree not much differing from one another; but the ſorts known and growing in *England* are three. *Virginia*, *Bermudas*, and the *Lebanon* Cedars.

This Tree, Mr. *Evelyn* ſays, grows in all Extreams; in the moiſt *Barbadoes*, the hot *Bermudas*, the cold *New-England*, even where the Snow lies almoſt half the year; and why then it ſhould not thrive in *Old England*, he conceives to be the want of Induſtry: It grows in the

Bogs of *America*, and on the Mountains of *Aſia.* He has frequently rais'd it of the Seeds, which He ſet like the Bay-Berries; and we might have of the very beſt kind in the World from the *Summer Iſlands* tho' now almoſt exhauſted there alſo; ſo that the moſt incomparable of that Sacred Wood, is like to be quite deſtroy'd, which is by Nature almoſt Eternal: What we have from *Barbadoes* and *Jamaica* is a ſpurious ſort, and of ſo porous a nature, as that Wine will ſoak through it; but that they call ſo in *New-England*, is a lofty Grower, which being ſawn into Planks make excellent Flooring, and everlaſting: They ſhingle their Houſes with it, and uſe it in all their Edifices.

It is the *Oxycedrus* of *Lycia*, which the Architect *Vitruvius* deſcribes to have its Leaves reſembling Cypreſs; the right *Phenician* Cedar has them like the Juniper, and it bears a Cone not ſo pointed and diſtinct in Scales, as thoſe from Mount *Lebanon*.

'Tis recorded that in the Temple of *Apollo* at *Utica*, there was Timber of near two thouſand years old, of this Wood: In *Sagunti* in *Spain* there was a Beam in a certain Oratory conſecrated to *Diana*, which had been brought from *Zant* two hundred years before the Deſtruction of *Troy*: The Statue of that Goddeſs in the famous *Epheſine* Temple, was of this Wood, as was moſt of the Timber Work in all their Sacred Buildings.

The *Sittim*, mentioned in Holy Writ, is believ'd to have been a kind of Cedar; of which precious Utenſils were form'd. *Seſoſtris* King of *Egypt* built a Ship with Cedar of 280 Cubits; and *Noah's* Ark is ſuppos'd to be built of Cedar: The Maſt of *Demetrius*'s *Galeaſſe* was One Cedar; and one of the Float that wafted *Caligula*'s *Obelisk* out of *Egypt* was four Fathoms in Circumference. 'Tis writ alſo of a Cedar growing in the Iſland of *Cypreſs*, which was 130 foot long, and 18 in Diameter.

The Cedar is excellent for Poſts and Columns, becauſe of its direct growth, natural and comely diminutions; and the more odoriferous the Trees are, the more durable and laſting. Mr. *Evelyn* wiſhes that Cedar might be brought into more common uſe, ſince beſides the everlaſtingneſs of the Wood, not obnoxious to Worms, and which would alſo be a means to preſerve Cloth and other Goods from Moths and Corruption; it would likewiſe be a Cure to reform the Malignity and Corroſiveneſs of the Air, and make this City as if it ſtood among the Spices of *Arabia*, or the Proſpects of *Mount Lebanon*.

Mr. *Mortimer* ſeems to have been very exact in, and to have underſtood well, the raiſing and cultivation of this *delightful* Tree, ſo *much* neglected, becauſe *little* underſtood. He tells us of that ſort which is eſteemed the tendereſt, *viz.* the *Lebanon Cedar*, that it bears even the ſevereſt Winters we have. He himſelf raiſed ſeveral of them of *Cones*, which he had from Mount *Lebanon*, and hath had a *Walk* long ſince planted with them. For, (as he rightly obſerves,) the Seeds *keep* well in the *Cones*, which may be brought from the furtheſt parts of the World with ſafety; and if the Seed is not taken out of the *Cone* till the time of ſowing it in the Spring, it may laſt good three or four years. Some years ſince there was a *fine* Tree of this ſort growing at *Stanſtead* in *Eſſex*, and I ſuppoſe it is there ſtill; for it had outlived ſome of the ſevereſt Winters when I ſaw it: It cannot be leſs than 50 years old, and therefore every year better able to reſiſt cold, and to naturalize it ſelf.

The *Juniper* is reckoned to be a ſort of *Cedar*.

Roſemary of ſeveral ſorts.

ROSEMARY is a fine Aromatic Ever-green Shrub, uſeful both in its Leaves and Flowers for many purpoſes. There are ſeveral ſorts of it, *viz.* the *Common narrow leaf'd*; the *broad leaf'd*, the *gilded* or variouſly *ſtrip't* with *Yellow*, and the *Silver Roſemary*: And Mr. *Mortimer* tells us of *another ſort* that bears double *bluiſh* Flowers. Thoſe that are *ſtrip'd* are moſt *tender*: But any of them ſet in a dry Soil, and under a tolerable ſhelter, will laſt many years, and defie the Froſts, which yet will *kill* them if they are planted in a *cold wet* Soil. They are increaſed very eaſily, either of *Seeds*, or *Slips*, ſet in *April* or *May*, which quickly take root, if they are Shoots of the laſt year. If this Plant is ſet againſt a *South* Wall, it may be trained up to a conſiderable height, and if it is planted in a ſheltered place in the Parterre, it will form it ſelf, with a little help of the Sheers, into handſome *Pyramids*. The *Roaſt Beef* formerly ſeldom appeared with any grace, except ſtuck with *Roſemary*: But *Time* and *Faſhion* alter both *Palate* and *Beauty*.

Bay Tree.

THE *Bay* is a Bacciferous, Ever-green Tree, conſiderable for its *Berries*; whoſe Leaves are ſhort, odorate, of a deep Green, and each Berry containing two *Seeds*.

Mr. *Evelyn* tells us they are increaſed both of their *Suckers*, and *Berries*; which ſhould be dropping Ripe before gathered: *Pliny*'s proceſs was the gathering the Berries in *January*, ſpreading them till their ſweat be over, then putting them in Dung, and ſowing them: To ſteep them in Water, is as well as Wine; ſome waſh the Seeds from their *Mucilage*, by breaking and bruiſing the glutinous *Berries*: then ſow them in *March*, by ſcores in a heap, and ſo they will come up in *Cluſters*; but not ſo fit for tranſplantation as where they are interred as you would *furrow* Peaſe: This way, and ſetting them apart, will raiſe Multitudes, and that in the Berries, without any farther preparation; only for the firſt two years they ſhould be defended from the piercing Winds, which frequently deſtroy them; and yet the ſcorching of their tender Leaves, ought not to make you deſpair, for many of them will recover beyond expectation.

This *Aromatic* Tree greatly loves the ſhade, yet thrives beſt in our hotteſt Gravel, having once paſſed the firſt difficulties; Culture about the Roots, wonderfully augments its growth; ſo as Trees of them will grow near thirty foot high, and two foot diameter. They are fit alſo both for *Arbour* and *Paliſade*-work, provided the Gardener underſtands when to prune them and keep them from growing too *Woody*.

The *Berries* are emollient, Sovereign in afflictions of the *Nerves*, *Cholicks*, *Gargariſms*, *Baths*, *Salves*, *Perfumes*; and ſome have uſed the Leaves inſtead of *Cloves*. It is a common thing with *Nurſes*, to eaſe Children of the *Gripes*, to boil Bay-Leaves in their Food. The Kernels of theſe Berries are very like *Wheat*.

Of late years abundance of theſe Trees have been raiſed and kept in *Boxes*, with curious round Heads, and ſingle Stems of four, five, or ſix foot high or more, and brought us over from *Flanders* and *Holland*; the great Uſe and Ornament of which in Parterres have encouraged us to raiſe them here. They appear in Tubs like *Oranges*; and, at pleaſure, make a beautiful ſmall Walk. And it is worth remarking here, that the wonderful ſtraitneſs of the Bodies of theſe Trees before they come to *Head*, is owing to an ingenious Contrivance of raiſing the whole Stem in one year in a hot Bed from a Plant cut down to the very root; and that is effected by means of a perpendicular Frame of Wood made for that purpoſe. *Lavender* and *Rue* are more reptile Ever-greens, and require much the ſame Soil and Culture from Slips.

The Laurus-tinus.

THE *Laurus-tinus*, tho' it is a *flowring Shrub*, and might properly be taken notice of under the next Catalogue; yet being a beautiful *Ever-green*, generally planted in Parterres and amongſt other Greens in the Wilderneſs Works, I ſhall give it its Place here. Some fancy there are ſeveral kinds, but I could never yet diſcover any other difference, but what might juſtly be attributed to the Soil or Situation. It is eſteemed and reſpected in moſt Gardens both for its conſtant *Verdure*, and its beautiful *well-ſcented* Flowers, which appear, contrary to moſt others, in all the Winter Months. It makes handſome headed Plants in the Parterre, and refuſes almoſt no Soil but thoſe that are cold and ſpewy: And in *ſuch* indeed a hard Winter kills them, Such Plants as are diſpoſed to put forth near the Root, ſhould be encouraged for the ſake of *Layers*, by which it is chiefly to be increaſed. The richneſs of the Soil is the occaſion of a ſtrong ſhooting from the Root, but *that* hinders its Beauty both in *Figure* and *Flowring*. And for the ſake of the laſt, I ſhould adviſe rather to plant it againſt a Wall, or in a Wilderneſs at large, where it need not undergo ſo much the ſeverity of the Knife. For an unſkilful Hand often deprives it of its greateſt Glory.

Privet, *Lentiſc*, and *Maternus.*

PRIVET is an Ever-green, much of late years out of faſhion, tho' formerly almoſt the only Green uſed for Arbours and Hedges. It loves to grow amongſt other ſtronger Trees and Hedges, being not ſo well able to ſupport it ſelf. It is eaſily raiſed by Suckers and Seed. The *Italian green Privet* is now got amongſt us, having Leaves much like the Olive. It loves a hot Soil, will bear the Severities of our Winter, eſpecially planted either in the Wilderneſs or Hedges, for it will bear clipping well; and becauſe it keeps its Verdure all the year, it is a great

Ornament to the Garden either in Hedges or Standards. The *Berries* are like thoſe of the Myrtle, and from them the Plants may be raiſed.

The *Lentiſc*, *Lentiſcus*, is another very beautiful Ever-green, brought originally from *Italy*, and therefore is of the tenderer Sort; but with a little care and ſhelter, it will thrive in a warm Soil, and may be propagated by *Suckers* and *Layers*. Mr. *Mortimer* recommends the Wood of this Plant for Tooth-pickers; and thinks the Maſtick thereof to be a Specific for the Teeth and Gums.

There is alſo a Plant called the *Maternus*, which being a kind of *Phylerea*, is alſo good for Hedges, and may be as eaſily managed.

Having thus given an Account of Foreſt-Trees and Ever-greens of all Sizes and Sorts; before I proceed to ſpeak of Flowring-Shrubs, *I ſhall ſay ſomething in general of the manifeſt Advantage and Uſe,*

Of Wood, and *Timber.*

EVERY Man, to be a faithful Steward of his Land, ought to put it to that Uſe that will bring in moſt Profit. And Enquiry ſhould be made into what may be gained by letting Wood grow on Land, and in what caſes it is neceſſary to compare the Benefit that may be made by employing it to *other uſes*, with the Benefit made by *Wood*; which two Profits being different in every Country, there is no poſitive Rule to be given for it; but it is poſſible to *direct* how the Compariſon may be truly made.

To which purpoſe there is a Method for making a Table, ſhewing when Land affords Profit by bearing Wood: Firſt, rate the Land at ſo much *per* Acre; then ſee what Price the Wood is in that Place, and what an Acre of young Wood will afford at *five* years for ſmall Hoops, Bruſh, Fagots, &c. which is the moſt benefit in ſome Places: What at *nine* years for long Fagots, Bavins, &c. What at *fourteen* years for Cord Wood. One Acre will bear twenty Cord (a Cord being a Stack eight foot long, four broad, and four high, every Stick at leaſt three Inches about) and after fourteen years, the Body or Stem increaſes ſlower, the Boughs more; and many ſmall Trees are deſtroy'd by the dropping of the more proſperous: Likewiſe what is to be made by Poles of *thirty* years old, &c.

Theſe Uſes take up the whole Benefit of the Land: And for *Timber Trees*, there muſt be known the Value of *Timber*; and we muſt ſuppoſe every Acre to bear 100; and each Tree at ſeventy years growth to have two Tun; and ſee what Satisfaction that will make for the long expectation.

To reduce the Trees to 100, many muſt be drawn out at *fourteen*, *twenty*, or *thirty* years end, whoſe Value will be known as above, and allowance is to be made againſt the Rent for their Value. Then Trees with their dropping ſowre the Graſs, 'tis true; but they kill *Moſs* and *Heath*, which elſe would cover ſuch Ground as will ſerve well enough for Timber Trees, (the Experiment muſt not be made in good Ground) and kill Bryars, and ſecure it to bear Graſs; ſo that the Profit of the Ground is hardly leſſen'd by the Trees ſtanding, there being ſtill Food for young Cattel: I need not ſay any thing of the Maſt or Profit of *Paunage*, which is yet ſomething. An *Aſh*, at *thirty* or *forty* years, is worth as much as an *Oak* at *ſeventy*.

If Land be intended at firſt for Timber only, Cattle may be turned in at ſix or ſeven years: But this is not the moſt profitable way. I allow nothing for the *ſowing*, becauſe poſſibly the beſt way is only to *ſtrew* Maſt on the top of the Ground, never breaking it: I have ſeen they come up thickeſt where never *cover'd*. Nor for *Incloſure*, *that* may be charged on the Land next the Wood, for the Tenant incloſes againſt the Lord, in whoſe hand the Wood is ſuppos'd to be: And if it be a Waſte, *&c.* it is already done.

When a *Wood* is fell'd, it muſt be incloſed from Cattle a year before, and ſix or ſeven after, for any Trees but *Beech*: They are drawn as they may be ſold; and Cattle hinder not the growth of young ones in their places: But it is not ſo for other Wood. So that in ſhort, the Table for purchaſing Annuities, applied to the preſent Rent of the Land, will ſhew whether the *Wood* coming in ſo many years, will at the end in that Place of the Country make amends for the ſtay.

I am confident many Places would find *Wood* the beſt Employment: It has this conveniency, that it yields ready Money at any intermediate time, and ſtill increaſes the Value of a Purchaſe; but it were good if one could tell the yearly Improvement of a Tree, as we can of Corn and other Products of Land.

With the Aſſiſtance of my Inquiſitive and Learned Authors, I have ſaid a great deal about *Oaks* (in its proper place) and other Wood; notwithſtanding which, Mr. *Houghton*, *F. R. S.* has plainly proved in an Eſſay publiſh'd *Anno* 1683, that if no Wood for Fuel or Timber grew within twelve Miles of a Navigable River within this Kingdom, 'twould be its great Advantage; as to Trade, *&c.* And as I have known few Gentlemen that have turn'd their Arable or Paſture to Wood, I ſhall here make ſome particular Notes on ſome of Mr. *Evelyn*'s Examples, as to the Improvement of Plantations in general.

His firſt Inſtance is *Latimer*'s Wood, in *Norfolk*, where 560 Acres of the beſt Saplings were worth but 3 *d.* each, but in 25 years they were worth 2 *s.* 6 *d.* each, and in 50 years about 10 *s.*; for 1380 Trees were valued at 700 *l.* beſide 40 *l.* made before; and the Land if it had been clear'd would not have let for above 5 *s.* the Acre. Upon which I remark, that theſe Saplings grew on old Stubbs, which I preſume makes them grow much faſter than if they had come from an Acorn; but what the difference is, I won't determine; however, the Charge of tilling and ſetting the Ground with Acorns is to be conſidered; likewiſe 20 *l.* a year for the 50 years, be it more or leſs; all which I'll reckon for nothing: But at 50 years end from the ſtubbing, the whole Growth was valued but at 700 *l.* with the Improvement it produc'd to the 50*th* Year, beſide the 40 *l.* made ſome time before, whoſe value I know not, but ſuppoſe it 100 *l.* in all 800 *l.* the whole Value of the Land by Wood.

But conſidering that Money at *compound* Intereſt doubles in ſomething leſs than twelve years, and 20 *l.* the year, ſo reckoning, amounts in 50 years to upwards of 6835 *l.* there is no Compariſon: Tho' the Acorns would have yielded ſomething, as alſo ſome few Saplings to make way for the reſt; but had all been cut down, the Improvement of the Land, beyond the Rent, would have exceeded all thoſe, and I alſo believe the Rent too.

Another Example of Improvement of Wood is as follows: In 1636, an hundred Timber Trees of Oak were ſold for 100 *l.* but the Buyer going from his Bargain, they continu'd growing till 1671, and then they were ſold for 560 *l.* and it looks like a very great Profit; but upon a nice Enquiry it will not be found ſo; for it is but an indifferent Oak whoſe Boughs will not reach one Pole on a ſide; and at that rate there can ſtand not many more than forty in an Acre; therefore I cannot imagine but that the Ground theſe hundred Oaks ſtood on, was worth 20 *s.* the year, and ſo the 35 years was worth in ready money 21 *l.* 1 *s.* 2 *d.* which doubled once in 12 years (as Compound Intereſt will do) and allowing one years growth more, the Rent would have amounted to 168 *l.* 9 *s.* 6 *d.* and the 100 *l.* would have yielded 800 *l.* both which make 968 *l.* 9 *s.* 6 *d.* then deduct from this the 560 *l.* the Trees ſold for, and there remains 480 *l.* 9 *s.* 6 *d.* only the one year is to be allow'd out of it.

The next Inſtance is of a Perſon who planted an Aſh; and before his Death ſold it for 40 *s.* I will not reckon the Ground this Aſh grew on to be worth any thing; but ſuppoſe the Aſh when planted was worth but one Shilling, and the Man liv'd 84 years after, the Shilling would have amounted to ſix Pounds and eight Shillings, which is far better than 40 *s.*

Again, three Acres of barren Land ſown with Acorns, in ſixty years became a very thriving Wood, and was worth 300 *l.* Becauſe the Land was barren, I'll ſuppoſe it worth but 3 *s.* the Acre, 9 *s.* the three Acres; which for 60 years was worth in preſent Money 15 *l.* 9 *s.* 7 *d.* which doubled every twelve years makes 495 *l.* 6 *s.* 8 *d.* Suppoſe that the Tillage, Acorns, and ſetting, came but to the third part of 15 *l.* 9 *s.* 7 *d.* it would be upward of 165 *l.* which together makes above 600 *l.* for the 300 *l.* My Author gives two more Inſtances, of very great Profits by Wood, but tells not how many Acres it grew on, therefore no Calculation can be made; but one (and perhaps both) grew in Hedge-rows, and ſo the Land coſt nothing.

But Mr. *Evelyn* ſhews, that almoſt any Soil is proper for ſome profitable Timber Trees or other, which is good for very little elſe. Then he gives ſeveral curious ways how to ſow and ſet Woods, to the greateſt advantage; as alſo a Calculation of one Captain *Smith*'s, of the great Profits made from 1000 Acres in 217 years; as alſo an Eſtimate what 20000 Acres would yield in 150 years, which amounts to many Millions of Pounds *Sterling*; tho' I preſume if ſo many were planted more than is, they would be worth little; or be as King *Charles* the Second ſaid to the Merchant, that ſaid if his Majeſty would encourage it, the Merchants would make Gold as plenty as the Stones in the Street; to which the King anſwer'd, then 'twould be no more than the Stones in the Street: And a great deal of Navigation for Wood muſt ceaſe, and by conſequence we muſt have fewer Ships and Seamen.

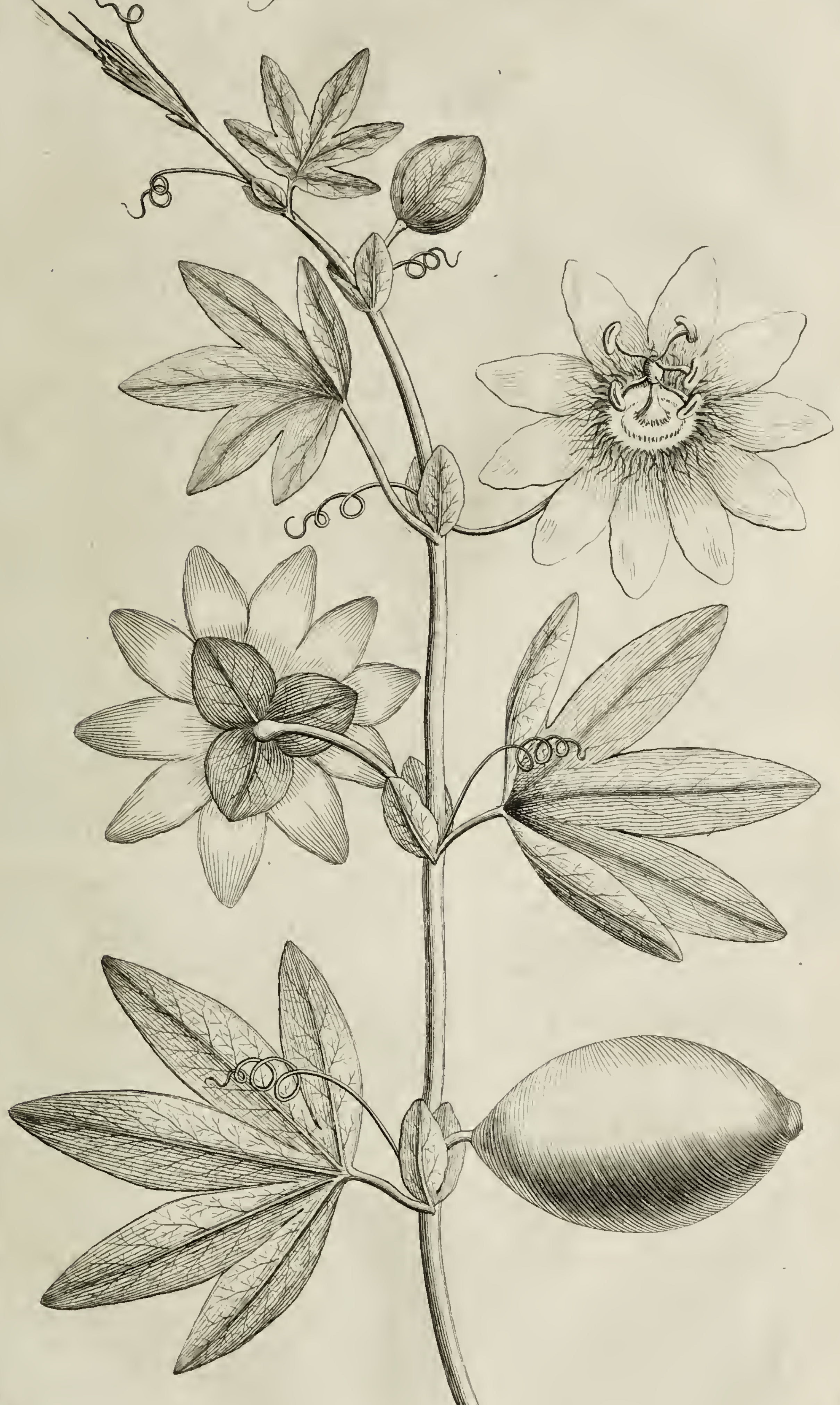
My Author, partly as a Divine and partly as a Philoſopher, concludes his Diſcourſe on Foreſt Trees, with Contemplations on the Weakneſs of the Beginning, and Grandeur of the Growth of Trees; and not only ſo, but of ſome being as hard as Iron, and others as ſolid as Marble;

ſome like the Birch, yielding more Wine in a little time than the weight of the whole Tree; and the contemptible Vine, that without help cannot lift it ſelf from the Ground, that yearly yields vaſt quantity of Wine, that is ſaid to *chear the Heart of Man.*

It has been obſerv'd, that Plantations of Trees attract and cauſe Moiſture and Rain; and in ſome Places of the World, they have no other Water to drink, than what their Trees afford them; not only of their proper Juice, but from their attraction of the Evening Moiſture, which impends in the ſhape of a Cloud over them. To what probable Cauſe this may be aſſigned, will be better underſtood, when the Nature of Vegetation is conſidered and explained. Of which in its proper Place.

I am aware that beſides theſe Ever-greens here mentioned, there are many other Exotics of late years introduced and naturalized amongſt us, ſuch as are found to bear the Severities of our ordinary Winters pretty well: ſome of which (as alſo of the Exotic Flowring-Shrubs) I have juſt named and inſerted in the Catalogue.

Paſsion Flower and Fruit



CHAP. III.

Of Flowring-Shrubs.

THAT I may compleat the Collection of Trees and Plants before mentioned, I ſhall now continue to diſcourſe of *Flowring-Shrubs*, but yet with as much Brevity as poſſible, becauſe theſe are generally well known, and their Cultivation as generally well underſtood.

Sena. I ſhall begin with the *Sena*, of which there are commonly known two Sorts, the *Scorpion*, and the great *Bladder* or *Baſtard* Sort, called *Collutea.* The *firſt* is the moſt beautiful; but *both* of them make a handſome ſhew with their yellow Bloſſoms both in Spring and Autumn. They are hardly able to ſupport their own weight, and therefore are pleaſed with the help of a Wall, or to be ſet againſt an Arbour, where they are *tonſile* and endure all Weathers. Eaſily increaſed by *Seeds*, *Layers*, and *Suckers*.

Laburnum. The *Laburnum* is rather a *Tree* than a *Shrub*, by ſome called the *Bean Trefoyl*, its Leaves being an indented *Trefoyl*, and its Pods reſemble *Beans*. Its *Strings* of yellow Bloſſoms look very beautifully in the Spring, and therefore tho' this Plant grows ſometimes to near 20 foot high, it obtains a Place among the Flowring-Shrubs and in Wilderneſs Works. It is eaſily raiſed from the *Seeds*, and grows in the moſt expoſed places.

Maracoc, or Paſſion Tree. I ſhould not do Juſtice to this moſt beautiful and glorious Plant, if I did not a little dwell on the Deſcription of it, as well as direct its Culture. The *Maracoc* or *Paſſion-Tree*, by ſome called *Grenadille*, and the *Indian Creeper* or *Climber*, is a very extraordinary Plant, for the ſurprizing *Beauty* of its Flower, the conſtant *Succeſſion* of them for ſometimes more than ſix Months, the *Verdure* of its Leaves, the *Length* of its Shoots, and the *Largeneſs* of its Fruit. There are ſeveral ſorts of this Plant, moſt of them impatient of extreme Cold; therefore here I am only to regard that one ſort ſo well known in *England*, which will endure our Climate pretty well abroad, and bear *conſtantly* Flowers, and Fruit ſometimes.

Mr. *Bradley* has taken ſome Pains in deſcribing the Nature and Culture of this Plant, to which I ſhall have ſome things and Obſervations of my own to add. The known ſort will certainly, if rightly managed, bear conſtant Flowers and ſometimes Fruit, as the Climate and Soil will ſuffer. But becauſe there will be a Neceſſity for a Deſcription of the Plant either in Words or Figure, I choſe to have the *Figure* thereof inſerted, as conveying a better Idea to the Mind than any verbal Deſcription.

From a View of this Figure, it may be ſeen the Flower has *ten white Petals* around it at equal diſtances, two Rows of *purple Threads*, a *Stile* reſembling the Pedeſtal of a Pillar, dividing it ſelf on the top into three parts, and beſet round at the bottom with Threads or Spikes erect. But as I ſaid *Inſpection* is beſt; and I have *ſaid* ſo much, only a little to explain the Superſtition of the Friars, when they make the Flower the Repreſentation of our Saviour's Paſſion; the great part whereof is forced to be help'd by pure Invention. The *ten Petals*, they ſay, are the *ten Apoſtles*; for one deny'd his Maſter, and the other hanged himſelf, and ſo were deny'd the Honour of a Place. The *Circle* of Purple Threads is the *Glory* commonly painted round the Head of our Saviour, and the *erect Spikes* are no ill Reſemblance of the Crown of Thorns. The *Stile* in the middle of the Flower is the *Pillar* to which Chriſt was bound when he was ſcourged, the *Claſper* is the *Cord*, and the *Leaf* is the *Hand*. One of the *Stamina* with its *Apax* is a *Hammer*, and the *four others* make the *Croſs*: But what is moſt deſired to be thought wonderful and ſurprizing is, that every Flower is juſt *three* days opening and ſhutting. It were happy for Mankind, if *Popiſh* Superſtition were always thus harmleſs!

But let us ſee what is to be done with this pretty Plant, that it may diſplay all its Beauties. That it delights in *moiſt* and *warm* Places is moſt certain, both what Mr. *Bradley* has told us from his Correſpondents, and alſo from what I have ſeen my ſelf; and therefore to ſurround the Roots often with Cow-dung, or to ſet it againſt a conſtant drain, or ſink of Water, is an advice to be followed, if it can at the ſame time have a *South* Aſpect; for the Cow-dung will keep the Roots cool and moiſt, and the Aſpect will be its defence and ſecurity in the Winter, which ſometimes kills this Plant down to the Roots; but then it will be ſure to revive again, which by the way is a better Emblem of the *Reſurrection.*

But ſtill there is a good deal of Care to be uſed in the *Pruning* this Tree, that it may bear Fruit; for to neglect it wholly, or to prune it too much, are equally injurious. He that knows how to prune a Vine cannot miſs of doing this as he ought. If you cut an old Vine down to the old Wood all over, tho' *that* be the way to get good Wood next year, yet *that year* you muſt expect no Fruit; or if you leave too much, or a confuſed Quantity of Wood, little good Fruit can be expected. Thus you muſt diſcreetly order this Tree as a Vine, leaving every where ſome of the laſt year's Wood four or five Inches long, the Tree ending in points, ſome ſhorter, ſome longer intermix'd, and not too many neither; for nothing is more apt to be confuſed than the Luxury of this Plant. In ſhort, prune it as you prune or *ſhould prune* the Vine, and you cannot err. But becauſe the *earlieſt* Bloſſoms commonly *ſet* for Fruit, it is a good way to ſet ſome Frames of Melon Glaſſes before the upper Parts of the Tree in *March* and *April*, to make the Tree *puſh*; and if you can procure Bloſſoms by the latter end of *May*, you need not fear a Succeſſion of Fruit, eſpecially if you give it plentiful Watering in ſome of the drieſt Months. The Fruit is in ſhape and colour like a *Lemon*; but the Inſide is more like a Pomegranate, of a ſharp, but not unpleaſant Taſte.

I have often wondered, conſidering the Beauty of this Plant, what a fine ſhew it makes againſt the *South* ſide of an Houſe, running ſometimes eighteen foot in one year, and how eaſily the Tree is raiſed both from Suckers, Layers and Cuttings, that it ſhould not be more propagated than it is. For indeed no place of Beauty ſhould be without it.

We are told that Mr. *Whitmil* of *Hoxton* has a new ſort of dwarf *Paſſion-tree* hitherto unknown, which bears Fruit very well upon ſmall Plants even in Pots, by the help of Supporters. One of them was brought laſt Winter to *J. Tempeſt*, Eſq; with Fruit upon it; and from the Seed this year I have raiſed ſeveral Plants.

Honey-Suckle. The *Honey-Suckle* or *Wood-bind* is of various ſorts, diſtinguiſhed by their Colours and times of blowing. All of them bear pretty ſweet-ſcented Flowers, and ſome of them come early in the Spring, and therefore deſerve our pains in propagating them. The Scarlet Flower is reckoned the moſt beautiful and blows late. They are called *Wood-Binds* as they are *twining* plants. They are eaſily raiſed from *Layers* or *Cuttings*. They do beſt in Arbours and againſt the ſides of Houſes, only they are apt in ſuch Situations to be infeſted with a ſort of Flie or Cantharides, which ſpoils all their Beauty, and makes them become offenſive. They look well among and about Trees in Avenues; and tho' they are not well made to ſupport themſelves, yet they may be formed into Heads from a ſingle Stem not too high from the Ground; and as ſoon as their bloſſoming is over may be clipp'd.

Pomegranate. The *Pomegranate*, which finds a place in this Catalogue, is that of the *double-flowring* Sort, whoſe Bloſſoms are of a moſt beautiful Scarlet Colour. Some ſet them in Arbours, and others adviſe them for Hedges of Wilderneſs Works; but both theſe ways ſeem too hazardous for a tender Plant. The great Beauty and Glory of their Flowers in *Auguſt* and *September* highly merit a tenderer Regard, even to have the help of a Shelter or Wall much in view and facing the *South*. But there is another ſort bearing ſingle Flowers of the ſame Scarlet, which in ſome years and ſituations *ſet* for fruit. I have ſeen above an 100 ripe upon one Tree at *Cue-Green* near *Richmond*. They are both propagated from Layers, and may be tranſplanted either in Spring or Autumn into a light warm Soil.

Solanum. The *Solanum* or *Night-ſhade* is of ſeveral Sorts. There is the *Shrub Night-ſhade* which has a woody Stock with dark green Leaves; and there is the *Tree Night-ſhade*, ariſing with a wooden Stem a yard high, with green Leaves and white Flowers like Stars: But neither of theſe are comparable to the Beauty of the common Sort which grows in Hedges (not able to ſupport it ſelf) when it happens to be variegated in its Leaves. For then is diſcovered no leſs than four Colours all at once in Autumn, *viz.* Purple Bloſſoms, Scarlet Berries, and at the ſame time green Leaves edged with white or cream Colour. This Plant muſt be ſupported with Help againſt a Wall; but it will do on any Expoſition. The tender weak Branches ſhould be removed every year, and it will not fail to repleniſh the Wall with new ones in the Spring, which attract the Eyes of the Curious, and Lovers of Beauty.

Meſereon. The *Meſereon* or *Dwarf-Bay*, riſes to two, three or four foot high, as they happen to like the Soil; for tho' they are ſtrong and hardy Plants, yet they are nice and ſomething hard to be pleaſed in their Roots. There are two or three Sorts of them. One which bears the *red* Flower, another which bears the *Peach-bloom* Flower, and another the *White*. Theſe Flowers are ſucceeded by beautiful *Scarlet* Berries, and ſometimes by *Yellow* ones, not ſo beautiful tho' more rare. Theſe Trees have two Excellencies which make them univerſally eſteemed. They are the firſt Trees which put us in mind of the *Spring*, by explaining their beautiful Sweet-ſcented Bloſſoms even in *January*, and continue them till *March*; and then give us, not a *Taſte*, but a *Sight* of their beautiful Berries all the *Autumn*. Theſe Berries are hot to a very violent degree; but yet the *Robin* is greedy of them, and they readily grow after they have paſſed thro' his Body. By which means they are ſcattered and raiſed in great Abundance.

Gilder-Roſe. The *Gilder-Roſe* bears Bunches of white Bloſſoms in *May*, as big as a large Ball. It is a hardy Plant, grows in almoſt any Soil, and is increaſed by Suckers. But not being willing to be chaſtized by the Sheers, or kept in any exact form, he ſubmits to be placed among the Plants of the Wilderneſs.

Roſe. There are more Varieties of a *Roſe* than of any other Flowring-Shrub. And if you conſider the *Beauty* of their Flowers, the *Fragrancy* of their Smell, the *Eaſineſs* of their Culture, and the *Continuance* of their Blowing, one or other of them ſometimes for nine or ten Months, it will eaſily be granted, that nothing amongſt this Tribe can better deſerve the Room and Place they require. But becauſe there are ſo many Sorts, it may be ſufficient to give a Catalogue of them in their order, as commonly diſtinguiſhed by the Gardeners; and then make ſome Remarks where particular Sorts require them. That which ought to have the preference to all others for Beauty and Colour, is the *Yellow Roſe*, ſingle and double: But the firſt Blower is the *Cinamon Roſe*; then follow the *Monthly Roſe*, and the *Cluſter Monthly Roſe*; the *Auſtrian Roſe*; the *Damask Roſe*; the *Province Roſe*; Mr. *Hart*'s *Roſe*; the *Belgic Roſe*; the ordinary *Red Roſe*; the *Roſamundi*, or *York* and *Lancaſter Roſe*; the *Marbled Roſe*; the *Velvet Roſe*; the *White Roſe*; the *Roſa Canina*; the *Musk Roſe*; the *Ever-green Roſe*; and the *double-bloſſomed Sweet-brier*: With ſome others of leſs note.

The beſt, tendereſt, and more excellent Sorts have ſucceeded very well by grafting on the Stock of the common *Sweet-brier*, or by inoculating on the *common Roſe* at *Midſummer*, which is the beſt way of propagating the *double Yellow Roſe*, whoſe Flowers are ſo very beautiful, and the Tree ſo little known, that I would prevent miſtakes in planting it, by ſaying, that it ſhould by no means be planted in a place too much expoſed to the Sun, nor in too light a Soil. The *fewer* and the *ſtronger* the Branches are left, the *fairer* will the Flowers be. The *Monthly*, and *Cluſter Monthly Roſes*, ſhould be ſet againſt a *South* Wall, to make them blow early and late; for in ſuch Station, with the Help of a little ſcreening and defence, I have known them bear till the beginning of *December*.

Altho' the ſeveral ſorts of *Roſes* differ in their times of ripening, yet their Culture and Propagation is much the ſame. They love a Marle or loamy cool Soil inclining to moiſture, and are raiſed from *Layers*, *Suckers*, or even *Cuttings*; which *laſt way*, tho' it is not the moſt expeditious, yet is what I would recommend rather than the *two former*, which commonly produce a multitude of *Suckers*; and *Suckers* are always Robbers and great Weakners of a Plant, and ſpoil its Beauty and Uniformity, which ſhould always be regarded. Take therefore the very ſtrongeſt and ſtraiteſt of the laſt year's ſhoot of a *Roſe* from the Root, and cut off from the Bottom every thing that looks like Fibre or Bud, and ſo examine it all up the Stem till you come within three or four Inches, or as many Buds, of the Top where you intend to ſhorten it, removing the Buds with a Knife. And in this manner keep always a Quantity in the Nurſery planted in the Spring in a cool place, agreeable to the direction of the *Gooſeberry* and *Current* ſpoken of in the Fruit-Garden. For this method ſecures it for ever from putting forth *Suckers*, and conſequently ſtrengthens the Plant. And this is the method you are to follow, if you intend to inoculate the *weak* and *tenderer* ſorts on the more *robuſt* and *ſtronger*; for thus they will always *form* beautiful Plants, *viz. handſome* Heads on *ſtrait* Stems.

The *Lilac* or *Pipe-tree* is of two Sorts; the one bears a *White*, and *Lilac.* the other a *pale blue* Flower, opening in *April* and *May*, and affording a very ſweet ſcent, hanging down in Bunches like *Plumes* of Feathers. The White and the Blew agreeably intermixt look very pleaſantly in Walks or Wilderneſs Works. They are raiſed from Suckers, which they are apt to put forth plentifully.

The *Almond* both *Standard* and *Dwarf* is of the *Peach-kind*, and *Almond.* until the large *Plumb* was found to be better, was uſed as a Stock for the *Peach*. But the chief uſe of the *Almond* now in *England* is for the Beauty of its Flowers, which appearing *very early* and of a *pale red*, attract every one's Eyes to them in the Spring. The *Standard* ſorts grow ſtrait, and make very handſome heads, and in good years bear tolerable Fruit *without* the help of a Wall, and *with* it are more certainly ripe. The Kernel is generally bitter, but ſome think that often removing them makes them grow ſweeter. The *Dwarf* kind is ſmaller in all its parts, ſomething tenderer, and valuable chiefly for its Bloſſoms, and is raiſed from *Suckers*. The way of raiſing the *Tree* is to ſet the Stones with their outward Coat in *October*, in the Place where they are to ſtand if poſſible; for they take a Remove very unkindly. But Care and Caution overcome great Difficulties.

The *Jeſſamine* hath great Varieties; but what concerns me at preſent, *Jeſſamine.* is to mention the Sorts that will endure our Winters without Houſing, of which ſort are the common *White*, the *Yellow*, the *Strip'd*, and the *Perſian* or *Purple Jeſſamine*. The firſt ſort hath branches of a deep green Wood flexible, opening at their Ends at *Midſummer* into a Tuft of divers Flowers, which are white and of a delicate perfume; which *Flowers* with us commonly fall away without ſeeding, and therefore the Plant is to be raiſed from *Suckers* (which it is apt to put forth plentifully) and *Layers*. It is generally uſed to adorn the outſide of an

Houſe, where it is very agreeable both to the *Sight* and to the *Smell*: But it is alſo a great Ornament to the large Plantations, and amongſt the Flowring Shrubs; where it may be trained up to a *headed* Plant, and will ſupport it ſelf: In which ſhape it may be ſet in Pots to adorn the Chimneys in the Summer Months.

The *Yellow Jeſſamine*, by ſome called the *Jonquil* from its Reſemblance to that Flower. From the ſlender Stems of this Plant, garniſhed with oblong ſharp-pointed Leaves, come the *Yellow* Flowers, conſiſting of five leaves in form of a Star. If it come (as ſome fancy) originally from *Mexico*, it is much it ſhould be ſo *hardy*; for no Winter, nor even no neglect hurts it: Its Flowers have little ſmell, and therefore muſt give the other the Preference; but yet it makes a pretty Variety, and may be raiſed as the other from *Layers*, &c. Both theſe are proper Stocks for moſt of the tenderer Sorts to be inarched or inoculated on; as alſo for

The *Strip'd Jeſſamine*, which is certainly one of the moſt beautiful of the whole Tribe of *Flowring-Shrubs*; having its Leaves and the greateſt part of the young Wood tinged with a *Gold-coloured Yellow* intermix'd with the *Green*. For tho' the Bloſſom is no way affected with the *Yellow*; yet the Leaves and Wood being of ſo beautiful a Die, the whole Plant ſoon attracts the Eyes of the Beholder. This may alſo be propagated by *Layers* and *Cuttings*; but it is alſo obtained by *Inoculation* on the plain *White*; and (as I have elſewhere largely explained) a Bud ſo put into the common ſort hath a ſtrange Virtue to communicate its Die to the whole Plant, even on Branches coming from the Root on the other ſide of the Tree, whereby the *Circulation* of the Juices or Sap in Plants, as the Blood in the Veins and Arteries of Animals, is undeniably proved to a Demonſtration.[a]

The *Perſian Jeſſamine*, which bears Flowers of a *purple* Colour, is alſo raiſed with us from *Layers* or *Suckers*, and loves a light, warm Soil, where it will bear our Winters well enough; and tho' it is but a ſmall Plant, yet it makes a pretty ſhew amongſt the Varieties of the Wilderneſs Works and *Flowring-Shrubs*. This precedes the other in flowring, and yields moſt pleaſant and well-ſcented Bloſſoms. There is alſo the *Indian Scarlet* Jeſſamine, which with the Help of a Wall and its Tendrils riſes to a great height, and affords a *Scarlet* Bloſſom: But it muſt be uſed tenderly.

Althea Frutex.

Althea Frutex, or *Shrub Mallow*, is of two ſorts, the *White* and the *Purple*; they are both equally hardy, and endure the Winter. They may be raiſed either from the *Seed* or *Suckers*. The Bloſſoms reſemble thoſe of the *Mallow*, from whence it hath its name, and ſhew themſelves very beautiful all the Summer till the Froſt overtakes them.

Tulip-tree.

Mr. *Bradley* has made it his Obſervation, that the *Tulip-tree* will not live in expoſed Places, but only in the *Wilderneſs*, and amongſt Trees deſigned for *Groves*. Its Leaves are ſomewhat like thoſe of the *Maple*, and its Flowers, which begin to open in *July*, are only on the Extremities. It is a Native of the *Weſt Indies*, and grows chiefly in *Virginia* and *Carolina*; but yet managed according to its Nature, is eaſily *Naturalized*.

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[a] See *Clerg. Recreat.*

ralized. There is a large one in my Lord *Pembroke*'s Garden at *Wilton*, and another at my Lord *Peterborough*'s at *Parſon*'s *Green*; but I think its Reſemblance to a Tulip is hardly ſufficient to challenge the Name. The *Petals* or *Flower Leaves* are of a *yellow Colour*, a little *variegated.* The *Fruit*, which is like the *Cones* of the *Fir*, doth not come to perfection with us; but as they are brought from *Virginia*, they may be ſowed in Autumn, and kept ſheltered in Pots during the Winter, and they will come up without the help of a hot bed in the Spring. They muſt be uſed *tenderly* for the firſt four or five years, and ſo may be eaſily uſed by degrees to our Climate, being ſet in a warm Sand.

Spirea Frutex.

Spirea Frutex is a ſmall Shrub, ſeldom riſing above three foot high. Its Beauty is chiefly in its Flower; for it bears a *Peach-coloured* bloſſom in *Auguſt*. It is an hardy Tree, and may be raiſed from *Suckers* or *Layers.*

Spaniſh Broom.

There is no great Beauty in the Leaves of this Plant; but its Flowers of little Pearls, or ſomething reſembling the Butterfly, make a pretty ſhew. There are two Sorts of this *Spaniſh Broom*, one with *White*, and other with *Yellow* Flowers, bearing their Seed of a *ſhining Red*. The beſt way to raiſe them is from the Seed. The *White* Sort is tender; but the *other* is a hardy Plant, and eaſily cultivated from the Seed. But as it has long and ſlender tap Roots, great Care ſhould be had in tranſplanting them; for nature beſt directs what it wants, and therefore *ſhortning* them too much will be againſt Nature. If the Farmer and Grazier would not too much wonder and ſmile, when I mention the *Engliſh Broom* and *Firze*, I ſhould think them not amiſs to be planted amongſt the Shrubs of the Wilderneſs. They both anſwer the Sheers, look green all the Winter, and bear pleaſant yellow Bloſſoms. The *Latter*, beſides its being as governable as the *Eugh*, bears its Bloſſoms the whole year round, which no other Shrub (I think) can boaſt of.

Syringa.

Syringa is another Sort of *Lilac*, which if planted in a ſhady place will grow almoſt in any Soil. It bears many Cluſters of Flowers of a *faint white*, or *primroſe* Colour; yielding a ſtrong Scent, ſome think, not much unlike the *Orange Flower*, but ſtronger and leſs grateful. The late Curious Botaniſt Biſhop *Compton* has obſerved, that the Leaves of this Tree taſte like green Cucumbers. It is much planted amongſt the *Flowring-Shrubs* of the Wilderneſs, and is raiſed with great eaſe from *Suckers*, which it puts forth plentifully.

Dog-Wood.

The common *Dog-Wood* is a dwarf Tree or Shrub, that grows frequently in Hedges, bearing white Flowers and red Berries, the Wood whereof is of great uſe to the Butchers, but eſpecially to the Silver Wire-drawers, to clean the Holes of their Plates from Wax, &c. But there is a *Virginian* Sort that makes a Tree as big as a Cherry Tree, which has likewiſe in *April* white Flowers and red Berries; the Roots whereof, boiled in water, the *Indians* uſe to heal green Wounds.

Sea Ragwort.

Sea Ragwort is another pretty Flowring Shrub. It has an uncommon light green *without*, and a white *within* or underneath the Leaves, which makes ſome call it the *powdered Beau*, and it produces Cluſters of *Yellow* Flowers about *Midſummer*. A very ſevere Winter is apt to kill it; and therefore it is proper to have ſome of it in Pots, which may be ſheltered in Extremities. And this will afford a Supply; for it is eaſily raiſed from *Suckers* and *Slips*, and grows almoſt in any Soil, if it have moiſture.

Barba Jovis. This is a Shrub ſhooting a Stalk about a foot and half high, which is hard and woody, covered with a downy Rind. At the end of the Branches appears a butterfly-like Flower, which, after it falls, is filled with a roundiſh Seed. This is only a Plant of Curioſity, and is ornamental amongſt the Flower-pots. But it muſt be well watered.

Virgins Bower. This Plant is of a twining, climbing Nature, and muſt be ſupported. It bears Flowers of a violet Colour, which grow in great Numbers, almoſt covering the Plant in *July* and *Auguſt*. It may be raiſed from Layers and Cuttings: Will do againſt Arbours and Walls, or among the *Flowring Shrubs*. There are alſo ſingle ones both *purple* and *red*; but the double ones of both Colours are moſt eſteemed. The more they are pruned, the better and fairer are the Flowers of both Sorts.

Periwincle. This Plant, tho' it is a ſort of *Reptile*, hath great varieties. For there is the *Broad-leaved* Periwincle; the *Narrow-leaved* Periwincle; the Periwincle with *white Flowers*; the *double Flowring* Periwincle; the *Yellow ſtrip'd* Periwincle; and the *Silver ſtrip'd* Periwincle with Purple Flowers: Theſe two laſt eſpecially make a fine ſhew, both with their Flowers and painted Leaves, which are alſo *ſemper virent*. It delights in the ſhade, and even under the Droppings of other Trees. But the way to make it ſhew its beauty moſt, is to make it hold up its Head; and that is by tying up its Branches to ſmall Stakes, and having thus by the help of Sheers made it to form a Sort of Pyramid, it may very well be reckoned a Companion for *Flowring-Shrubs*. There is no difficulty in propagating it; for it grows from every Knot or Joint: On the contrary, there ſhould be care uſed to plant it where it may not over-run the Ground.

Many more there are of this Kind more common and of leſs note, which I ſhall not think fit to trouble the Reader with, as either growing wild in the Hedges, or elſe diſcover little or no Beauty. But (as I have before remarked) there are alſo many *Flowring-Shrubs* from abroad introduced amongſt us, and are by experience found to be hardy enough for our ordinary Winters; ſome of which I have therefore juſt named in the Catalogue.

Thus much may ſuffice to be ſaid concerning Forreſt Trees, Ever-greens, and Flowring-Shrubs: But becauſe there are Hints to be given about Growth and Planting, which may be thought uſeful, I ſhall add here one Chapter more.

CHAP. IV.

Of the beſt Ways and moſt general Seaſons for Setting Plants, &c.

ALL Trees, Shrubs, and Plants of a woody Subſtance, that have Bodies able to endure the Cold, are beſt ſet *before Winter*, as ſoon as the Leaves begin to fall; and a Quickſet Hedge of this Seaſon is obſerved by far to outgrow another of the like kind planted in the *Spring*. Artichokes and Aſparagus (whatever the modern Practice may have been to the contrary) do exceedingly well being planted at this Seaſon of *Autumn*, if ſet in a rich warm Mould, and ſomething defended the enſuing Winter from violent Froſts. For *Artichokes* it is ſufficient that a Trench be caſt up between the rows for the defence of the Roots: And (as I have ſeveral times obſerved) *Aſparagus* is a very hardy Plant, and needs no ſhelter after the firſt year.

For Herbs and choice Plants, eſpecially thoſe that are ſet without roots, it is moſt proper that *they* be ſet in the *Spring*: Such as *Hyſop, Thyme, Savory, Marjoram, Wall-flowers, Pinks, Carnations*; with this Caution; that by how much more tender and delicate each Plant is, in regard of Cold, the *later* it requires to be ſet, and in the *warmer* place.

As to all bulbous and tuberous rooted Plants, it is accounted the beſt way both for their Preſervation and Improvement, that they be taken up every year out of the Ground, and kept ſome time within doors in dry places, where they may have *free Air*, and *little Sun*. *Tulips, Ranunculus* and *Emonies*, ſhould be taken up before *Midſummer*, and kept within doors till *October*, which will tend mightily to their Enlargement and Increaſe: Tho' *Fritelaries, Peonies*, and *Crown-Imperials* are ſomething impatient at Removes, and thrive better without it. There is, without doubt, a diſcretion to be uſed with reſpect to the ſeveral Kinds, and the Quality of the Ground where they are to grow. The *Narciſſus* and *Crocus* are commonly taken up firſt; generally when the Flower is gone and the Leaf withered, and the Bulb full, is the beſt Seaſon. And then as to thoſe Gardens which lie cold and moiſt, and are apt to be overflowed or ſoak'd with Water in the Winter, (for Summer Wets never hurt them) the *later* bulbous Roots are ſet, the *better* and ſafer from danger.

Concerning Plants that are ordinarily ſet abroad and left without future Care and Attendance, little need be ſaid here; only theſe Obſervations (which I am forced to repeat) may not be amiſs to be taken in by the way; that it is greatly his Intereſt that minds the thriving of his Plantations, (whether they be large or ſmall Trees) that they be ſet ſo, that the Roots may only juſt run under the Turf, in the Surface of the Earth; the higher the better; eſpecially if due Care be taken the firſt year to keep them moiſt at the Root with Weeds or long Straw; or, which is ſtill beſt, with being paved round with Stones and afterwards well watered.

I have ſeen ſome Plants ſo buried in a depth of thick Clay or Gravel, that they could not ſhoot for many years any but weak and ſickly Branches, hardly a Span long; whereas others of the ſame kind planted high and according to Art, thrived abundantly even in the ſame Neighbourhood; nay, the very ſame Trees, commanded to be raiſed, have been obſerved to exert their natural Vigor to a Wonder.

Orchards require to have the Ground *all over* trenched, *i. e.* the upper Surface to change place with the lower Soil, and the Trees to ſtand at eight yards diſtance in the *Quincunx* Order. Without this Care and Diligence it is not to be hoped, (ordinarily ſpeaking) that you will receive the expected Fruits of your Labour. And if the Ground is ſhallow and ſubject to too much Moiſture, all Tap-rooted Trees are to be rejected, or you muſt plant them very high, without making any Hole, with untried Earth ſuperinduced; and after that, lay on a Load to every Tree of ſuch Dirt as is found in the Streets, and diſpoſe it in ſuch a manner as to remain *concave* round the Tree, the better to retain the Dews and Rain. The want of this Proviſion and Practice is the Occaſion that *Orchards* are ſo often found unthriving, and the Trees obſerved to be *ſtunted* and *dwarfiſh*, and the Stems and Branches to be covered over with Moſs.

For the planting of *Woods* in general, and for the increaſe of *Underwood*, the following Method is generally approved and found right; *viz.* to caſt up double Ditches, and plant the ſeveral Sorts in form of Quickſets, ſowing alſo Keys, Acorns, and Seeds on the Banks in orderly rows. The beſt time of doing this, is as ſoon as the Leaf is fallen, without any regard either to the *Moon* or *Weather*. The Plants propagated in dry and more ſound Grounds are *Oak*, *Aſh*, *Elm*, *Sycamore*, *Maple*, *Crab*, and *Thorn*. In the more moiſt grounds and boggy places, the *Poplar*, *Willow*, *Sallow*, and *Oſier*, are with moſt reaſon contrived to be planted, and all of them by *Truncheons*; but yet with this Caution, that they ſhould grow rather *by* than *in* the water: For none of them will grow *long* or *much* in ſuch Bogs as have no Soundneſs of Ground, and are under Water the greateſt part of the year.

As to the vulgar Notion of raiſing *Elms* from *Chips*, that muſt be a miſtake, which the Country-man was probably led into from his obſerving Elms to grow from amidſt the Graſs, where *Elm-Chips* were ſcattered on the felling of large Trees: But the young Plants which have been there obſerved to riſe, muſt neceſſarily proceed from Suckers ariſing from the old extended Roots remaining in the Ground. And theſe Suckers may eaſily be miſtaken to ariſe from the Chips, becauſe they always come upon the felling of Elms where Chips are found, and grow at ſuch diſtance as Chips are ordinarily ſcattered.

As to the Growth and Increaſe of Vegetables otherwiſe than by *Soils* ordinary and artificial, or from the Surface of the Earth, I think it is demonſtrable and plain by every day's experience, and by what I have ſaid of the continual Augment of Plants ſet in *Water*. For beſides the Slips of *Mint*, theſe which follow will grow and flouriſh from the Nouriſhment they receive from *Water* alone, not excluding the Terreſtrial Matter it contains; viz. *Penny-royal*, *Bugle*, *Prunella*, *Water-Croſs*, *Purple-Graſs*, *Periwincle*, *Crow-foot*, *Brook-lime*, *March-Mallows*, *Laurel*, *Scordium*, *Tripolium*, *Knot-Graſs*, *Panax-Coloni*, *Fetherfew*, and ſome others; not meaning thoſe which will make ſome Puſhes of Vegetation both in Leaves and Roots, and yet ſoon after die, of which there are a great many.

But further than this, I have already obſerved, that even the *Air* it ſelf contains ſo much vegetable matter in it, that ſome Plants will flouriſh and grow by the Help and Virtue of that Nouriſhment alone; as moſt of the bulbous Roots will do; as well as the *Sedums* and *Orpines*. However, to that reaſoning I think fit to add in this place, that *Onions*, *Tulips*, and all bulbous Roots, tho' by virtue of the Air and what it contains, they ſhoot out a green Leaf, yet that they conſtantly much *leſſen* in their weight, which is a demonſtration that they *exhale* more than they *receive*; and their Growth is little more than a motion of the ſame parts, or rather another order or ſituation in relation to each other. For the *Onion* particularly has the thicker Coverings of the Bulb very much ſtretch'd out, and each Covering, as it increaſes in Length and Breadth by riſing into a Leaf, ſo its Bulk, while it covered the Bulb only, decreaſeth proportionably, and is moulded into a thinner and more largely extended Veſtment.

Thus divers *Sedums*, *Orpines*, *Tythmals*, and ſuch like Plants, known to ſhoot and grow in the open Air, and are ſuppoſed to increaſe and to be augmented thereby, tho' the Plants *grow* well; yet upon experience are conſtantly found to loſe their *Weight*. Thus again *Aloes*, tho' it have been hanged up in the Air with a Cloth dipt in Sallet Oyl, and is obſerved for many years to put forth new Shoots and Leaves, yet it always grows leſs and leſs in *weight*, till at laſt the oldeſt Leaves falling off, and new ones ſucceeding, it grows to *nothing*.

It may not be amiſs under this Head, to take notice that in planting Avenues or other Rows or Cluſters of Trees, intended for Beauty and Ornament, great Care ſhould be taken and Judgment uſed to chuſe *ſtrait*, *handſome*, and *well proportioned* Trees. For beſides the Uneaſineſs that every deformed thing gives to the Beholder, there is nothing more certain than this, that in all Animal Nature every thing that is *ſtrait* and *well proportioned* thrives and flouriſheth moſt; and on the contrary, every thing that is crooked and out of ſhape is more or leſs dwarfiſh, ſtunted and unthriving; as having the Ducts and Paſſages for the Circulation of the Blood or Sap leſs open, or ſome way or other obſtructed. Which Obſtructions are the Occaſion of thoſe Diſappointments which careleſs Planters meet with, when tired with Expectations of having their Deſires anſwered, they *late* (too late) ſee their Error in planting ill-choſen crooked Trees.

Whereas if Diſcretion and Judgment be uſed in the Choice of ſtrait-bodied Trees, with ſhining Bark; (a great Indication of Health;) and ſuch Trees, deſigned for Ornament or Uſe, or both, be planted according to the Rules laid down, and in the right Seaſons, in *Autumn* or early in the *Spring*, (tho' the firſt is to be choſen) you may, without preſumption ſoon expect to ſee Nature exert her ſelf to the utmoſt in all her regular Operations, and draw up your Infant Plants by ſwelling and extended Progreſſions to their full Stature, ſo as to anſwer your End in planting them, and excite your Thankfulneſs to the Author and Diſpoſer of all things.

A

NEW SYSTEM

OF

AGRICULTURE

AND

GARDENING.

BOOK III.

Of the Fruit Garden.

ALTHO' I have ſome years ſince publiſhed to the World my Thoughts on this Subject in ſeveral Treatiſes, which have been very kindly entertained and accepted: And altho' ſeveral others alſo have followed me with many ingenious Obſervations and Improvements on vegetable Nature, whereby the Art of Gardening is become a Science now pretty well underſtood; yet for as much as this Treatiſe is intended to be a complete Syſtem of *Agriculture* in all its Parts; and every day's Experience gives freſh Light, towards aſſiſting Nature in her generous Inclinations for the good of Mankind, I have thought it reaſonable to explain and make eaſy the whole Myſtery of chuſing, raiſing, planting, and pruning the *Fruit-Garden*; that the whole by a regular, and orderly Government, may bring *Pleaſure* and *Profit* to the Owner; whereby two of the greateſt Views of human Life are agreeably and innocently entertained and anſwered.

But that I may proceed in ſome plain, eaſy, and regular Method, I purpoſe to begin my Directions from the firſt Riſe that a Man's Deſires take, who is to begin *de novo*; that ſo having before his Eyes as it were

Tabulam raſam, as a blank Paper he may write upon it what is proper and moſt likely to anſwer his Purpoſe every ſtep he takes in a proper Order. And if ſo be a Man's Lot and Circumſtances be ſuch, that he finds it is not in his Power or Choice to follow the exact Method laid down, he may eaſily break in upon it, and either *chuſe* or *refuſe* what is *for* or *not for* his Purpoſe. This being premiſed I ſhall begin to treat,

CHAP. I.

Of the moſt deſirable Situation for a Fruit-Garden.

OUR Seaſons here in *England* are moſt commonly ſo very uncertain, eſpecially in the Spring, when Fruit-Trees are making their firſt Attempts to reward the Owner, that it is very deſirable to have it in ones power to chuſe a proper Situation; ſuch as may in great meaſure prevent the Inconveniencies of the mercileſs Winds, and the Miſchiefs attending the two Extremes of *Wet* and *Dry*; *Hot* and *Cold.* To this purpoſe an eaſy Deſcent or Inclination of the Ground facing the *South-Eaſt* is much to be deſired, always ſuppoſing that every Quarter but *that,* be well guarded with Trees at a convenient diſtance; which Guard, if it is not already found, muſt inſtantly be made, that no time may be loſt: But the *Weſt* and *South-Weſt* Quarters call for the Maſter's more immediate Vigilance and Care; becauſe according to the conſtant Obſervations I have made for many years, the Winds from thoſe Quarters reign for near three Parts in four of the whole year; and conſequently as they make the greateſt Havock and Deſolation in a *Fruit-Garden,* ſo they call for a more immediate and effectual Remedy; without which, whatever ſome may think, who truſt to Buildings and high Walls, which only create Eddies, moſt of the Planters Labour and Charge will be fruitleſs.

An eaſy Deſcent or Declivity to the *South-Eaſt* is alſo deſirable for theſe following reaſons. (1.) Becauſe ſuch Poſition receives the greater Quantity of the Sun's Rays, and conſequently more of his ripening Influence. (2.) Becauſe it makes a natural, and yet not too haſty a Drain for exceſſive Winter Wets, oftentimes deſtructive to tender Trees and Plants. (3.) Becauſe it cauſes a natural Guard and Defence againſt the *North* and *North-Weſt* and *Weſt* Winds; eſpecially if the Riſe of the Ground behind the Houſe and Garden towards thoſe Quarters be any thing conſiderable; which is much to be wiſhed for.

Under theſe Circumſtances, and with the Advantage of a good Soil, (of which I ſhall ſpeak preſently) I venture to repeat what I have formerly ſaid, and that with more Aſſurance, becauſe grounded upon further Experience, That three or four Degrees of *Northern* Latitude, is a trifling Conſideration, and ſhould diſcourage no Lover of a Garden from attempting to plant and propagate the tendereſt Plants, and the beſt and lateſt Fruits.

The Biſhoprick of *Durham* lies near the Latitude of 55, inferior to few in Riches and Beauty; we are preſented here with many right and proper Situations; and tho' the Art of Gardening has but in a manner juſt reach'd theſe Parts, yet where there has been any tolerable degree of Art and Diligence uſed, and the Soil and Situation favourable, I ſee nothing deſirable in a Garden wanting: For altho' my own Situation is upon a Hill unguarded, and I have the misfortune to be deprived of all Hopes of getting either much or good Fruit, unleſs I could aſſwage the Fury of mercileſs Winds; yet amongſt many of my good Friends and Neighbouring Gentlemen, I cannot but mention it with pleaſure, that I never eat *more* or *better* Fruit in my Life, even of all the *beſt* and *lateſt* Sorts, except *Grapes*; which for want of Courage are found planted but in few Places; and where they are found, miſcarry only for want of Skill in pruning; as I have already given occaſionally ſome Demonſtrations.

In ſhort, every Gentleman or Clergyman that hath but the deſirable Situation here mentioned, or indeed but ſome good degrees of it, let him not imagine he is too far *North*, but take courage, and flatter himſelf with ſucceſs in planting, when I tell him the Biſhoprick of *Durham* affords Plenty of the tendereſt Peaches and Nectarines, and even the late *Katherines* in perfection.

In the Garden of my good Friend Dr. *Hudleſtone* at *Durham*, beſides many other tender Curioſities, the *Paſſion-tree* or *Maracoc* preſents it ſelf in great Beauty and Glory; and tho' the Tree is but ſix or ſeven years old, hath already made ſome promiſing attempts for ripe Fruit; and that Reward I doubt not will be granted in a few years more: But indeed the Plant (tender as it is) grows in many other places like a Weed, and where it is diſcreetly placed, neither refuſeth nor diſlikes the Climate; which I take this occaſion to mention, that I may confirm and ſtrengthen what I have formerly laid down and ſupported by a Table of the Quantity of the Sun's heat in ſeveral Latitudes from 44 to 56; whereby it appeared, that tho' three or four degrees of Latitude do produce *ſome* conſiderable difference in the degrees of Heat and Cold; yet that *that* difference is perhaps leſs conſiderable than is commonly thought; and conſequently that there is more weight laid upon that difference than it will bear, when a Gentleman ſuffers himſelf to be diſcouraged from planting and managing *Peaches* and *Vines*, becauſe he happens to live under 54 or 55 degrees of Latitude.

Which Calculation led me formerly to ſay further, " I am ſo ſenſible " how little there is in that Diſadvantage, that if the Rules laid down " be but followed, I am ſanguine enough to hope for Succeſs even in " the moſt *Northern* Part of this Kingdom; and it it is with pleaſure I " expect to hear of good Grapes at *York* and *Durham* too ". Moreover, it is not to be forgot what I have formerly obſerved alſo, that a *Northern* Latitude hath this Advantage; that from the two Equinoxes in Summer, (the time of ripening Fruits,) there are no leſs than 100 Hours of Sun-ſhine at *Durham*, more than there are at *Plymouth*, as might eaſily be demonſtrated by a Table.

Upon the whole. When the deſirable Situation here mentioned for a Garden *can* be had, I think it ſhould, almoſt at any Rate, be choſen; and when it *cannot* be had, either in whole or in part, the firſt Care is how to mend it by Artificial Shelters of Hedges and Rows of Trees, and by Conduits and Drains, as they are found to be wanting.

CHAP.

CHAP. II.

Of the moſt deſirable Soil for a Fruit-Garden.

THE Situation of a Fruit-Garden, tho' it is a very inviting Circumſtance; yet is not the only thing to be regarded. A good *Soil* will do wonders, where a bad one will do almoſt nothing without much Time, Labour and Charge. The Soil therefore (if one were to chuſe) that I ſhould call a *good one*, is a rich Loamy Earth, with near an equal Mixture of Sand and Clay two foot deep, and under this either a Sand or Gravel, or ſomething elſe analogous to them, rocky and chiſelly, or the like.

I do not ſay there is no other *good* but ſuch; for Chalks and Marles and ſome Sands will do exceedingly well with due Mixtures ſuperinduced; but the *natural* Soil I would chuſe, as beſt of all, is what I have already mentioned, and if it is *untried* will laſt many years without mending: And therefore ſhould, I think, as near as may be, be the Standard of all *Artificial* ones.

I am ſufficiently ſenſible, that this *natural* deſirable Soil cannot ordinarily be had at will or pleaſure; and therefore it may be expected, that I ſhould give ſome Hints and Directions how to mend Defects. The *Fruit-Garden*, and that only, is *now* in our View: So that according to my own Principles long ſince eſtabliſhed, and which I know to be right, I baniſh all Dung whatſoever as Poiſon, and a Nuiſance, for reaſons I ſhall hereafter give. If the Soil then is Clay, ſuperinduce Sand; If Sand, Clay; and the bottoms of Ponds are the proper Mixtures and Manures for it. The one makes a convenient Separation of the Parts of Clay, and the other fixes the Sand: And herein lieth the whole Myſtery of a laſting Improvement.

CHAP. III.

Of Planting: The beſt method and time of doing it.

BEFORE I give my directions for planting, I would only premiſe theſe following things, as ſeaſonable Monitions and timely Notices to every ingenious Contriver. (1.) Let no one be over ſollicitous to reduce an irregular piece of Ground into any exact Squares; becauſe Irregularities may eaſily be made Beauties: ſtrait Lines, either in Walks or Hedges, bring every thing into Shape and Order. (2.) Except where Room for Fruit is much wanted, there is no neceſſity to be at the Charge to build high Walls; becauſe tho' every Height can be filled and employed, yet Fruit-trees neither want it, nor much deſire it. Eight or nine foot high is ſufficient for every thing but a Pear. (3.) An exact Poſition or Aſpect to the four Quarters, is not much to be regarded, as of conſequence to the Proſperity of a Fruit-Garden. For if it be walled round (as it ſhould) and the Walls make either obtuſe or acute Angles, or both, there will be almoſt every Aſpect, good and bad, which may be agreeably filled according to Art and Rule. Only this I would ſay; the more of *South-Eaſt* and *South-Weſt*, the better; eſpecially the former; and there is no need of being very ſollicitous for a full *South* Wall; becauſe a Wall that declines either way 20° or 30° hath as many Hours of Sun, and then both Declinations are almoſt equally good: (4.) I cannot but add by way of Caution; that no one be over covetous to enlarge his Fruit-Garden beyond what can reaſonably be well managed and carefully minded. Forty or Fifty yards Square is enough for almoſt any Gentleman's Fruit-Garden. The great Exceſſes beyond this proportion I have long obſerved to be one great Occaſion of Barrenneſs. The Moſt are apt to covet a large Extent, but Few are willing to allow Hands enough to manage it [a].

Having premiſed thus much, I now come to the great Buſineſs of PLANTING. And altho' the performing this aright is of the greateſt conſequence to a Man's future Pleaſure and Profit; yet, however it comes to paſs, it hath not been well underſtood, and ſeldom rightly inculcated by thoſe who have treated on this Subject. It is certainly a great Miſfortune to ſet out wrong, and it is commonly thought that of all Errors a fundamental one is the worſt. However, Truth, as it hates Darkneſs, is plain, beautiful, and uniform; and as it loves the Light, is eaſily made clear and intelligible to the Underſtanding.

That I may then, conſiſtent with Reaſon, ſet this Matter in its proper Light, I muſt here take it for granted, that the Borders both under the Walls and where the Dwarfs and Eſpaliers are to be placed, be made with, and *only* with the beſt *Virgin* or *Untried* Earth which can be got, agreeable to the aforegoing Directions; not above a foot or foot and half deep at moſt; and four or five foot wide. The raiſing theſe Borders muſt be diſcretionally done. If the Situation be low and inclining to Wet, they may be raiſed ſeven or eight Inches above the Level; if the Soil be ſandy or gravelly, little or no Elevation is beſt.

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[a] *Fæcundior eſt culta Exiguitas, quàm Magnitudo neglecta.* Palladius.

The Borders being thus prepared for Planting, the diſtance of the Trees next offers it ſelf to be conſidered. Here there hath been a general Failure in Practice, eſpecially in Paliſades or Eſpaliers; but whatever hath been the Practice, ſure I am the general Rule ſhould be four yards diſtance both for Walls, Dwarfs and Eſpaliers; that there may be ſufficient room given for *horizontal* Branches; and that the Gardener, for want of it, may not be forced to ſuffer the Branches to run *perpendicularly*. This then being agreed on, the whole Plan ſhould be ſtak'd out in the proper diſtances, that when the Trees are made ready for planting, the Gardener may have nothing elſe to do but to *plant*.

The Fruit-Trees then being procured from ſome of the honeſteſt Nurſery-men in or near *London*, (amongſt whom I have long known Mr. *Parker*, and his Aſſociate Mr. *Woodman* to be of that Character) if they have been any conſiderable time out of the Ground, or their Roots have been much dry'd, it is good to ſteep them in a Horſe-pond twenty four Hours, to ſupple and to recover the Roots: After this, Art and Care is to be uſed in pruning the Roots, which you muſt do by taking off all the ſmall Fibres entirely, and ſhortning the bigger Roots to about ſix Inches from the Stem; and if they have received any Wound or Gall in their Carriage, that part of the Root muſt alſo be cut off. Three or four Spurs are ſufficient, and therefore the reſt ſhould be quite removed; becauſe too many large ones remaining on a tranſplanted Tree, are one Occaſion of that groſs Wood, ſo diſagreeable both to its Bearing and Beauty; and are indeed in their Nature as ungovernable and tyrannical in a Tree, as a proud, ſwelling covetous Perſon is in a Neighbourhood, who licks up the Fat of the Land, and tries to over-reach and ſtarve every one that lives near him.

The Head of the Tree muſt alſo be cut off, that it may form an agreeable Figure at the bottom with *horizontal* Branches; ſome chuſe to ſtay till the Spring before they do this, contenting themſelves only to cut off ſome, and leave the reſt to be ſhortned again afterwards. Others finiſh this Operation before they plant, ſhortning the Tree to about ſix Inches above the place of Inoculation or Grafting, leaving the Slope where the Knife went facing the Wall, the Root at ſome little diſtance, and the Top near touching it; contriving alſo, as near as may be, that two *collateral* Buds towards the top may be left to ſpread horizontally; and if any are obſerved to project forwards, they ſhould be rubb'd off at their firſt puſhing.

There is however a diſcretional power to be uſed with reſpect to thoſe Trees which are only removed from one Neighbouring Place to another, taken up with great Care and moſt of the Earth about the Roots: For I have frequently removed theſe, without either pruning Root or Branch, and that with Succeſs; and with this deſign too, that I might check the luxuriant growth of a too vigorous Tree running altogether into Wood.

The *Time* and *Manner* of Planting are next to be conſidered. As to the *firſt*, there is a pretty great Latitude in an open Winter; for in ſuch caſe, that work may be performed from the middle of *October* to the middle of *March*. But becauſe an open Winter cannot be foreknown, I would chuſe *October* and *November* for the beſt Seaſon of planting Fruit-Trees, or indeed almoſt any Trees that are not very tender; ſtrengthened alſo by theſe reaſons; That a Tree planted in *Autumn*, will better diſpoſe it ſelf for putting forth ſuch fibrous Roots as may ſupport the Life of the Tree, and prepare it for the kind Influences of the Sun in the *Spring*; and alſo remove one conſiderable part of the Gardeners work from the Hurry of other neceſſary Buſineſs in the *Spring*. However, no time is to be loſt; a few Years make a great Hole in the beſt Part of a Man's Life. If Autumn and the Winter Seaſon be ſlipp'd thro' Indolence or Neceſſity, the Spring is thankfully to be embraced, as a Seaſon for planting not to be deſpiſed.

The *Manner* of doing this deſerves no ſmall part of our Regard; becauſe on this depends in great Meaſure the hopes of future Advantage. I ſay this; becauſe the too common practice hath been to bury a Tree *alive*, which of all others is the *worſt*, becauſe *moſt lingring* Death.

Let then the Gardener be prepared with a ſufficient quantity of *untried* Earth made fine, and have a Barrow-full ready for every Tree. Let the Tree, already pruned, as before directed, in the Head and Root, be placed in its appointed Station, not digging any Hole, but with the Hand preſſing it an Inch or two into the prepared Border; and after that lay on the fine Mould, diſcreetly filling the ſpaces betwixt one Root and another, till at laſt there appear a Semicircle round the Tree four or five Inches higher than the reſt of the Border. This I call planting a Fruit-Tree.

This high planting, if it be performed with Care and future Caution, prevents that luxuriant Growth, ſo fatal to Peaches and Aprecots eſpecially; running them into Gum, and many other miſchiefs attending a too haſty vigour, as will be obſerved hereafter. However,

To prevent Inconveniencies from hence alſo; After a Tree is once planted according to Art in a proper Place and with a ſuitable Soil, theſe two things ſhould conſtantly recur to the Thoughts of the Planter; *viz.* to keep it *cool* and *moiſt*. For it is a moſt certain Truth, that the hot Rays of the Sun are highly prejudicial to the Growth and Proſperity of the Tree. Its Weakneſs at firſt planting is eaſily overpowered by uninterrupted and unintercepted heat, and doth almoſt as impatiently bear the violent heat of the Sun, as the optick Nerves do ſuffer its Meridian Rays.

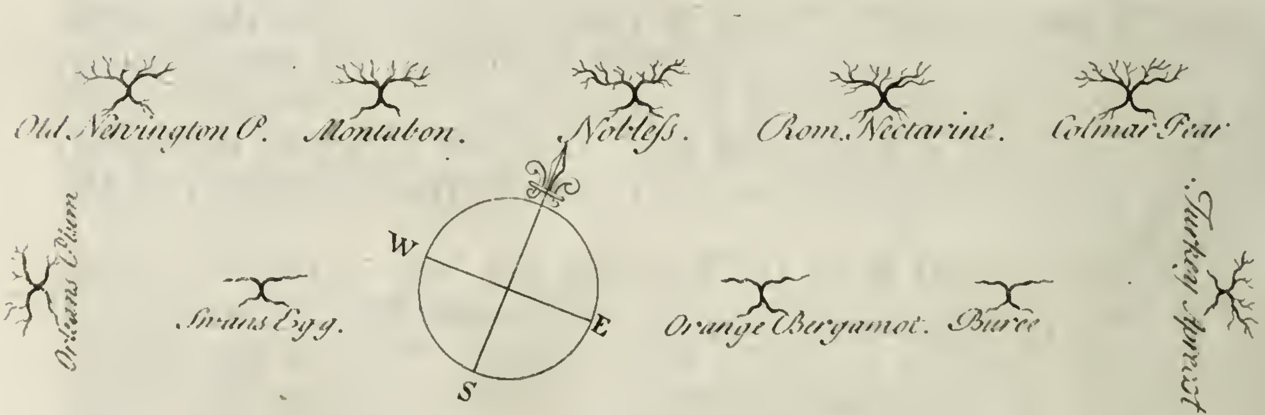
And then again, if ſo be the Tree was not hurt in this Particular; yet if after planting, any laſting or conſiderable Drought ſucceed, it muſt greatly ſuffer in its health and proſperity, if it do not actually languiſh and die. To prevent therefore theſe two Dangers and Inconveniencies, the following Care is ſtrongly recommended and preſſed. Soon after planting, pitch or pave the Tree round with Stones or Pebbles, in a convenient Circle, a foot or two Diameter, diſcretionally judged, according to the Bigneſs of the Tree and the Extent of its Roots. If the Tree be Standard or Dwarf, it muſt be an entire Circle; but if a Fruit-Tree againſt a Wall, it muſt be only a Semicircle. When this is done, as it may be with a very little Art, ſo as to look not unpleaſing to the Eye, (the Circle being made a little concave to hold the Water) let the Tree be throughly well watered, and if neceſſity require, let it be repeated once more, in the extreme Droughts of *April*;

and I have found by long Experience that a Tree rightly planted and pruned in the Head and Roots, and in right health, cannot well miſcarry. For this Method exactly and excellently anſwers the two before mentioned Requiſites for the Growth and Proſperity of a new planted Tree; *Coolneſs* and *Moiſture.*

N. B. I chuſe not to plant a Tree in the very Coines or Angles of the Walls, having obſerved that ſuch Tree ſeldom flouriſhes well for want of Air; tho' it is to be noted, that the Fig-Tree reſiſts this Inconvenience, and is therefore *there* beſt placed, becauſe it may *there* be beſt defended with Mats from the Extremities of the Winter.

The Mode of the *French Eſpaliers* are not proper for our Climate; and therefore *Paliſades* are rather to be adviſed, which may be formed and ſupported by *occaſional* Uprights. The Charge of a framed Eſpalier is great; and if it be made (as is common) ten foot high, before the Fruit-Trees need regularly that Support at the Top, the *whole* will be in a decaying Condition. The Paliſade-Fruit-Hedges have been diſcontinued chiefly for want of Skill in planting the Trees, becauſe only or chiefly their *horizontal* Branches bear Fruit: Whereas hitherto the Method of planting has been (for what reaſon I cannot tell, except from Art in the Nurſery-man to force a Trade) moſt commonly at four, or five, or ſix foot diſtance; whereas ten or twelve foot aſunder ſhould be the leaſt diſtance, if much more than Branches and Leaves be expected.

It may not be amiſs in this place to adviſe a good Method of knowing and preſerving the Memory of the ſeveral kinds of Fruit newly planted; and that is by a Survey or Plan of the whole, deſcribing a plain Figure of each Tree with the Name underwritten; ſo as that you have alway before your Eyes even in the Houſe, the Order, Name, and Situation of every Tree. Thus,



Pag 292.

Before I conclude this Head about Planting, becauſe I am ſo unfortunate as to differ from moſt others who have treated on this Subject, I think my ſelf obliged to aſſign the Reaſons why I directed the Borders to be made ſo ſhallow as only a foot or foot and half deep, and alſo baniſh all Dung as an Enemy. For (1.) From long Obſervation and further Experience I have found, that too great Proſperity is the moſt dangerous State; and tho' the other Extreme calls for a Remedy, yet that

Remedy is more eaſily apply'd. Over-luxuriancy in a Fruit-Tree ſubjects it to *Gum* and a great deal of *falſe Wood*; which is an Evil hardly to be cured, except by taking up the Tree, and planting as I have directed, and ſometimes by wounding and maiming ſome of the Roots. Whereas (2.) If there is no Failure or Fault at the Root, Superinductions and Waterings quickly cure Poverty and Weakneſs. But ſeldom or never do I find Trees complain for want of Riches, if the abovementioned *Competency* be allowed. They *will not*, and indeed they *ſhould not*, be proud or arrogant in their way of living, ſtriving to overtop their Neighbours, and aiming to be great and high. Humility is more ſuitable to their Condition, and better anſwers the End of their Being: For by a gentle and gradual Progreſs they *ſooneſt* attain a State of bearing Fruit, and gratefully rewarding their Benefactors; and which is more, they continue and remain longeſt in that State, bringing forth Fruit to the end of their Lives.

If tall Cherries, Plums, *&c.* be planted at firſt in the intermediate Spaces to fill the top of the Wall, have a Care they do not ſtand there too long; and they ſhould be planted chiefly amongſt the Wall-Pears, which are hardy and ſtrong: Neither let the Borders be filled up or worn out with Colliflowers, and the too ordinary Trumpery of *Lavender* and *Roſemary*; the great Deſtroyers and Beggerers of Soil.

It will not be neceſſary here to mention the true Aſpect every Fruit-Tree ſhould have; becauſe that will naturally fall under the Deſcription of each Tree, whether Peach, Pear, or Plum. Neither need I ſay any thing here about *horizontal Shelters*: Their Direction will come under the Chapter of Blights. As to the firſt, I would only ſay, that a ſtrict Regard is to be had to the true and proper Expoſition, becauſe I am ſenſible there has been great Diſappointments attending the Ignorance or Miſtake of this Point; as when ſome of the beſt *French* Pears (no way inferior to good Peaches) are thought to merit no better than *North-Eaſt* or *North-Weſt* Walls. Or elſe they are planted at the very end of a *South-Eaſt* or *South-Weſt* Wall, where they are deprived of three or four Hours of the Sun by a *Northern* Wall interpoſing.

In the Borders amongſt the Eſpaliers or Dwarfs may very conveniently be ſet Gooſeberries and Currants in the intermediate Spaces, for a time.

CHAP. IV.

Of Pruning.

THERE is nothing in the whole Myſtery of Gardening that hath more employed the Thoughts or exerciſed the Pens of the Curious, than the Art of *Pruning*; rightly judging that wiſe Laws and wholeſome Rules give true Life to the *Vegetable*, as well as the *Moral* World. And this Art is the more difficult, becauſe moſt Trees require a *diſtinct* Management, and ſome a very *different* one.

Whether there be any thing in the Conceit of ſome Authors, who tell us that *Pruning* was firſt diſcovered by the Effect of the Aſs's cropping the Vine, I know not: but this is certain, that the Luxuriancy and Vigour of moſt healthful Trees is like the extravagant Sallies of Youth, who are apt to live too faſt, if not kept within due Bounds, and reſtrained by ſeaſonable Corrections,

Monſieur *Quintinye* was the firſt that attempted to ſpeak very particularly on this Subject; and ſome others both *French* and *Engliſh* have ſince endeavoured to explain and enlarge his Rules: But whether they have made the Art ſufficiently intelligible or not, I ſhall not determine; but chuſe rather, in my own way, and according to my earlieſt and lateſt Experience, to diſcover to *others* what appears to *me* to be right, and worthy of Notice; that this Work may approve it ſelf as complete as I intended it, and may be expected.

Now becauſe in the Buſineſs of Pruning, it may be difficult to ſpeak to every Caſe in an exact Method, without great Repetitions; to avoid which therefore I chuſe (as I formerly did) to lay down ſome general Rules as the fixt Laws, whereby every Pruner ſhould govern himſelf, when he hath his Hammer and his Knife in his hand ready for Diſcipline. Let it then be taken Notice of as an undeniable Maxim,

I. That the more the Branches, or indeed the Body, of any Tree is led or bent down horizontally, the more apt and the better diſpoſed that Tree is to bear Fruit. So on the contrary, the more upright or perpendicular the Branches or Body are ſuffered to lie, the more diſpoſed that Tree is to increaſe in Wood and leſs in Fruit.

This is a known and experienced Truth: And it is ſufficiently confirmed by the common Obſervation of ſuch Trees as have been blown aſide by the Winds; ſometimes ſo much that half the Roots are made bare, and the Trunk lyeth along very near the Ground. Such Trees as theſe I ſay are obſerved always to bear Fruit abundantly; altho' Nature re-directs many of the Branches to an erect and perpendicular Poſture for its Increaſe in Wood. The Reaſon of this Obſervation ſeems to be: That by bending down the Branches of a Tree from a perpendicular to an horizontal Poſture, you thereby check the free Circulation of the Sap; which Check, whether it be done by Art or Accident, cauſes leſs vigorous and luxuriant Shoots to be formed, and conſequently more bearing Buds: Agreeable to another Maxim, *That bearing of Fruit is alway the Effect of ſome degree of Vigour loſt.*

II. As a Conſequence then of the aforeſaid Maxim, it ſhould ever be the Care, and always in the Memory of the Pruner, to keep the middle of a Tree, whether Dwarf or that againſt a Wall, free from *great* Wood or *thick* Branches; which, tho' they will increaſe and grow upon him, he is to cut entirely out, waiting for *weaker* in their Places. I always think it a defect of Skill, if a Tree be ſuffered long to continue without bearing Branches and Bloſſoms in ſome plenty. For tho' a Gardener cannot command Fruit from Bloſſoms by reaſon of bad and uncertain Seaſons, and ſo cannot have it *when* he pleaſes; yet he may in a manner have it *where* he pleaſes, and keep every part of the Tree in a bearing State; but yet his greateſt Skill of all is diſcovered when he makes the *middle part* of the Tree to bear.

III. Another general Rule is, That a Tree be not over-full or crowded with Wood, no, not even with Fruit-Branches; which yet is too often ſeen, to the great damage of the whole. Nature cannot ſupply a ſufficient Quantity of ſuitable Juices to ſupport them, and then it followeth that none of them will be *well* ſupplyed; but the Bloſſoms will either drop off, or if they ſet for Fruit, it will be ſmall and inſipid.

IV. One general Rule more is, To leave all ſtrong and vigorous Shoots *longer* than the weak and feeble ones, even on the ſame Tree; conſequently the Branches of a ſickly Tree are to be pruned *ſhorter*, and left *fewer* in Number than thoſe on a healthful Tree. Which Practice and Reaſoning is founded on this certain Maxim, not ſo well obſerved as it ought; That all Pruning more or leſs taketh not away, but *gives* Vigor.

But becauſe, as I have already hinted, there is a diſtinct Management required for ſome of the beſt ſorts of Fruit, I ſhall mention every Particular, that nothing material may be omitted in an Article that requires ſome Application.

CHAP.

CHAP. V.

The Vine.

Vine. I Begin with the VINE, which is the King of Vegetables, and juſtly claims the Precedency. This is to be pruned with great Judgment and Diſcretion, if any valuable Reward of Fruit is expected; and yet, tho' it moſt requires a *repeated* Skill, it is generally leaſt underſtood or minded. It is *beſt* pruned in *November*, altho' the two following Months will anſwer well enough; but much later than *that*, will ſubject it to bleeding, which weakens the *Vine*, and hinders the Fairneſs of the Fruit. Contrary to moſt others, it bears its Fruit on the ſtrongeſt Shoots. Theſe therefore muſt be left, cut to five, ſix, ſeven, or eight Buds, diſcretionally judged, with a View to fill the Wall with one ſhorter and another longer; cutting the ſmall weak Branches *entirely out*. And as the old Wood begins to grow upon you, cut every year ſome of it out from towards the Bottom, that *that*, and indeed the whole Wall, if poſſible, may be filled *horizontally* with young Wood. Obſerve to let the Track of the Knife end in a Slope on that ſide oppoſite to the laſt Bud; and then nail it as cloſe to the Wall as poſſible; not with Leather or any ſuch ſtubborn Matter, but with Shreds of *Woollen*, that will ſtretch and yield without galling the Branches. Have a Care of leaving too many even of the larger Branches: Near a foot aſunder is, generally ſpeaking, enough; becauſe no other Tree is ſo apt to fill with Wood and Leaves, and conſequently to breed confuſion as the Vine.

This *Firſt* pruning muſt be finiſhed before *February*. The *Second* is to be performed in *May*, when the Cluſters appear; and then the extended Shoot is to be pinched off five or ſix Inches above the Fruit, at the ſame time nailing the very Fruit, if poſſible, that it may touch the Wall. And foraſmuch as the Vine is apt to be aſſaulted with many Robbers in the Body and bigger Branches, eſpecially of an old Vine, theſe are carefully to be rubb'd off and checkt at their firſt Appearance; for nothing indeed ſhould remain upon the Vine in Summer, but what is abſolutely neceſſary for *Wood*, *Fruit*, and *Shelter*. And this I would repeat and lay a ſtreſs upon, to prevent the common and contrary Practice, of letting ſo much unneceſſary Confuſion remain uncorrected.

But the Vine muſt ſtill be again and again diſciplined. A *Third* time about *Midſummer*, when all ſhould be re-examined; that it may be diſburthened of a multitude of Branches it will have put forth, and the Rays of the Sun may be ſuffered *gradually* (not too much nor all at once) to ſalute the ſwelling Fruit. And ſo alſo again,

A *Fourth* time ſhould the Vineyard be viſited in *Auguſt*, and carefully watched, that nothing of Shade or Shelter, either natural or [a] artificial, be wanting, and yet nothing ſuperfluous.

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[a] See *Chap. of Blights.*

The Vine requiring ſomething a different Soil, and Culture, from other Fruits, it may be neceſſary to add in this Place, that the Soil and Situation of a Vine cannot well be too dry; inaſmuch as it loves even the dry decayed Rubbiſh of Buildings, and the refuſe Lime-mortar thereof. This mixt with an equal Quantity of untried Earth is a good Border for Vines, which ſhould not be planted nearer than ſix or ſeven yards aſunder on low Walls, that the Branches may have room to run *horizontally*.

The Vine is apt to take a Remove very unkindly; and if the Roots are much dried in the Air, it will hardly be perſwaded to grow. Therefore it is good to wrap wet Moſs about the Roots, as ſoon as taken out of the Ground; or, as Mr. *Bradley* adviſes upon experience, to ſupple the Roots with Soap, and after planting to give them a plentiful Watering.

There have been ſeveral Attempts of late made to accelerate the ripening of Grapes in *England*; as putting the Fruit in or behind Glaſſes; to run the Branches on Slope-Walls or the Tiles of the Houſe: The *firſt* Method is apt to make the Fruit inſipid, and the *laſt* ſubjects them to the cold Nights, and perpendicular Dews and Vapours then falling upon them. The moſt rational and beſt approved Expedient yet found out, is *artificial* Fires on the *North* Side of the Wall, made hollow with ſeveral horizontal Tunnels, both under the Roots and along by the Body of the Wall, to receive and convey the Heat and Smoke; and this in the *North*, where Coals are plentiful, is no expenſive Method: Or elſe to lay freſh Horſe-Litter from the Stable on the Back of the Wall, which gives a conſtant, gentle, and ſweating Heat, very agreeable to the Growth of Vegetables. Only it is always to be remembered, that if the Vines by any artificial Heat puſh before their natural time, great Care muſt be uſed to guard them from the Froſts till *April* and ſome part of *May* be over.

If the deſired Soil, and Situation, and Climate before mentioned were well conſidered and improved, I do not ſee but it muſt turn to a very good Account, in ſome of the *Southern* Parts, to plant a well ſheltered Spot of Ground to be ordered in the Method of a Vineyard for making Wine. It is generally thought that the *South* Side of a chalky Hill is exceeding proper: But I ſhould rather chuſe an untried hot Sand or rich Gravel; becauſe this will retain the heat of the Sun much longer; even ſo as to continue warm in the Abſence of the Sun, and in ſome meaſure influence the whole circumambient Air.

Vines thus planted in the way of Vineyard, *viz.* at two foot aſunder, and the collateral Rows 3 foot diſtance running *Eaſt* and *Weſt*, require ſomething a different Management from thoſe planted againſt a Wall: For as ſoon as the hopes of Fruit are come, (which may be expected after the third year of planting) in *November* or *December* you are to prune all away except one of the ſtrongeſt, as a Reſerve for a Standard Plant about four or five foot high: Only ſuch as you find about the Bigneſs of an handſome Reed, *theſe* you are to regard and a little *ſpare*, by cutting them only to two or three Buds or *Eyes* next the Ground. Then apply a Prop to every one of your Vines, and tie them to the main *Standard-Shoot* before mentioned, with Oziers, about one foot from the Earth, bending the *top* of theſe *Shoots* to the next Prop about two foot from the Ground, that ſo the Ranks may ſtand in form of Arches, whilſt the *Eyes* that you *ſpared* now in dreſſing ſhall the *May* following be bound to the Props for the next years bearing.

In the beginning or middle of *June*, when the Fruit begins to bloſſom, ſtop the ſecond Joint above the Fruit; but remember to leave the ſtrongeſt Shoot four foot high to be the *Standard Plant* of the year enſuing. In the beginning of *September*, when the Fruit begins to turn and ripen, break off ſuch Shoots as you ſhall find too thick upon thoſe you pruned in *May*, only ſo as to let in the Sun, and not leave the Fruit naked.

You are now to obſerve that the *Standards* which you laſt tied to the Props at a foot high, and whoſe tops were bent to the next, will the following year be grown *old Wood*; which for that reaſon at the next pruning Seaſon is to be cut cloſe to the Ground; and his Place is to be ſupply'd with that ſtrongeſt Shoot which you left for that purpoſe as a *Standard Plant* four foot high; and which you muſt order as before directed: Pruning all the weak Shoots to the very Earth, and leaving two Eyes to each of the ſtronger, as before. Be ſure to remember every Winter to give the Vineyard an ordinary digging, with a Care of ſparing the Maſter-Roots, affording alſo a Coat of well prepared or elſe *untried* Earth.

Altho' I think the *black Cluſter*, and the *white Muſcadine* ſhould be planted and encouraged for their early ripening; yet I think the true *Claret Grape*, which is an excellent Bearer, ſhould have its place in a Vineyard, by reaſon it affords the *moſt*, and *propereſt*, becauſe the *rougheſt* Juice for making *Wine*.

CHAP. VI.

The Peach, Nectarine, and *Aprecot,* &c.

I Put theſe three together, becauſe their Pruning and Management is much the ſame; and indeed I might include all the Fruits which are uſually comprehended under the Title of *Stone-Fruit*; and then Plums Cherries and Almonds, would fall under this Head alſo. All which (Cherries excepted) are ſo nearly allyed, that they make, as I may ſay, one Family, and admit the ſame Rules of Government.

But by reaſon there are ſo many Varieties of Caſes to be conſidered, from the different ſorts of Fruit, the different Soils, and the different States of Health each Tree may be in, I ſhall not add a great deal here to the general Rules already laid down, which I would have well conſidered. Stone-Fruit is very apt to put forth Plenty of bearing Wood after the ſecond or third year of planting, eſpecially the Peach and Cherry, ſo that there cannot want choice of good ones. Theſe are eaſily diſcovered in *February*, by the Bigneſs of the ſwelling Buds; and that generally tempts moſt to defer their Pruning till then, that they may the better know what to chuſe and what to refuſe: Which however ſometimes proves pretty difficult, when the Tree is over-vigorous, and ſhoots every where in great confuſion.

The biggeſt of the Wood, which is commonly in the middle, muſt unavoidably be cut quite out, that ſome of the larger ſort which remains may be left the longer, even to ten or twelve Inches; which yet if it continue increaſing in Wood-branches, muſt alſo be cut entirely out as ſoon as the Wall can be furniſhed with ſmaller Wood. The Fruit Branches, if they are not over-long, may be left to their extent untouched, provided at the ſame time you have near it a Wood-Branch pruned to four or five Inches, which will ſupply the Vacancy in caſe the Fruit-Branch dies, as it often will.

Let it be the firſt care in pruning theſe Trees, to fill the Wall at the Bottom with horizontal Wood-Branches, truſting to the middle to provide for it ſelf: But I never chuſe to bend a Branch beyond the horizontal Poſture with any View of Continuance; becauſe it ſeldom long outlives an uſage ſo contrary to Nature. All dead, ſapleſs and yellow Wood is to be cut out, and every *Autumn* (not *Midſummer*) Shoot muſt be rejected as uſeleſs and unprofitable. It is very wrong and unſeemly to ſuffer a Tree to grow out of Shape, much more extended on one ſide than the other, which indeed often happens from a defect at the Root; but this Evil is eaſily remedied by a Reduction, when the Tree is diſengaged from the Wall, eſpecially while it has Youth of its ſide.

I add here by way of Caution. Beware of a common Fault in pruning, letting the Wood-Branches run without controul and leaving them too long in one year. This is an Evil hardly to be remedied in Trees of ſome Age, becauſe the Bark of Stone-Fruit is generally hard and tough, and will not ſuffer Nature to puſh any new Shoots thro' it. The Conſequence

ſequence of which is, that Trees ſo managed, become barren both of Wood and Fruit, at the bottomand middle of the Tree, which haſtens its Ruin; agreeable to this Maxim; *That good pruning not only procures Fruit, but makes laſting Trees.*

Having thus, before the Leaves appear, formed your Tree into Beauty and Order, the next thing to be done (and it is commonly done with too much Reluctancy) is to thin the Peaches and Aprecots, when too great Plenty appears, the latter end of *April*: For without this care, there will be few or none fit to be eaten. After this there will be little to be done here till *Midſummer*, when there muſt be an eſpecial Regard had to an Operation very ſeaſonable and neceſſary: *viz.* To ſhorten or pinch all ſtrong luxuriant Branches to *two Inches* of the Place from whence they ſhoot, with a View to get ſmaller and Fruit-bearing Wood in its place. This Practice is right both in reaſon and experience. Winter pruning (as I have obſerved) *gives* Vigour to a Tree; but this Operation, when Nature is in its full Carriere, *damps* its Vigour, and *chaſtiſeth* it into Fruit.

The ſame Reaſon holds for *plaſhing* a ſtrong Branch of a Peach or Aprecot, ſhooting directly forward; for tho' *that* is not to be done in Winter, yet *now* it may, and that *ſafely*; and ſuch Branch may be ſo diſpoſed, as to fill a void place with weak and bearing Wood.

When both Peaches and Aprecots begin to turn their Colour for ripening, it is very proper to pick off ſuch Leaves as hang directly before the Fruit, that the Sun may reach them with his ripening Influence, and give them their inviting beautiful Colour, in perfection.

As Plums and Cherries need little Art to make them thrive and bear againſt a Wall, ſo neither do they want ſo much Attendance and Care as the other choicer Fruit. Altho', to make them *laſting* and *healthful* as well as *handſome* Trees, the general Rules laid down ſhould by all means be ſtrictly obſerved.

CHAP. VII.

The Pear.

THERE is no ſort of Fruit which affords us greater Varieties than the *Pear*; all originally raiſed from the Seed, and propagated by Grafting and Inoculation. And there are ſome ſuch admirable Sorts of this Fruit now acquired, that not even the moſt *melting Peach* can exceed them in their high Flavour and richneſs of Taſte. Inſomuch that many of them juſtly merit the beſt Place we can give them, and our higheſt Regard and Care in the Management of them. For which purpoſe therefore, beſides the general Rules already laid down, I ſhall offer ſome particular Directions neceſſary to be obſerved for the obtaining a ſufficient Quantity of this delicious Fruit.

It is to be obſerved, that there are two ſorts of Stocks generally made uſe of for propagating the Pear; which I mention here, becauſe they require very different Management: The Quince, and the Wild Pear-Stock. The firſt is made uſe of for its early bearing: Being a Dwarf, and ſlow Grower, the Grafts put upon it are ſooner diſpoſed to throw out bearing Wood. Accordingly it is difficult to make it ſpread to any tolerable Height, except in a moiſt and loamy Soil; and even in the moſt *agreeable* Soil, it is apt to be ſickly and not long-lived. However, it is proper to have ſome Pears on this Stock, becauſe you will quickly be rewarded; and ſome think it gives a vinous Flavour to the Fruit. The Pruning here is not difficult, becauſe you have only weak Shoots to deal with, and thoſe muſt be pruned *ſhort*.

The free Stock or Wild Pear makes the moſt ſtately, beautiful and laſting Tree; but all our Care and Diligence is called for to keep it under Diſcipline and within due bounds. And therefore no Tree more requires the ſtrict Obſervation of thoſe general Rules already laid down. It is indeed naturally too proud for a Wall: But ſeaſonable Corrections keep all in order, which would otherwiſe be perfect Anarchy and Confuſion.

The *horizontal* Poſture of the lowermoſt Boughs is a ſufficient Check to their Ambition; and ſo nothing more but nailing them to the Wall, without any prnuing, is required. But the nearer you approach to the perpendicular Poſture, the more they begin to be unruly and to want Correction. But it is a miſtake to think *pruning* or ſhortening the Branches is a *Correction*: On the contrary, it is a real *Indulgence*, and *adds* to its Vigour: I have therefore often found it neceſſary to *plaſh* the moſt vigorous Shoots, cutting them near the place from whence they ſhoot, more than half through *upwards*; which checks the Vigour, and forms Fruit-branches. Even ſometimes a Branch projecting and which ſtands condemned, by ſuch Inciſion is made to fill a vacant place with good Wood.

But becauſe the great difficulty is to manage the very ſtrong perpendicular Branches, that will be always puſhing up in the Middle; I muſt add, that I make no difficulty to cut the Bark of theſe quite round two

Inches wide, peeling it quite off to the Wood in *May*, and then ſhortning the Branch, ſo as it may beſt ſerve the Turn wanted. By this means that great Barrenneſs ſo obſervable in the middle of moſt Pear Trees, will be remedied by a Fruit-bearing Branch; which if it die in four or five years, yet will bear Fruit all that time, and will infallibly be ſucceeded by many more to be uſed in the ſame manner.

Some have been diſcouraged in this Experiment, whilſt they unadviſedly disbark the large Branches, and, it may be, the very Trunk of the Tree; which if it fail, will make either an unſeemly Gap and Defect in the one caſe, and may chance to deſtroy the Tree in the other: Whereas ordinarily, except in the way of Experiment, no Branches ſhould be thus ſeverely uſed, but ſuch as are not above three or four years old; and that at the proper time too, in *April* or *May*. To diſbark them only half round (as Mr. *Carpenter* ſeems to adviſe) is doing nothing. Becauſe a *vigorous* Pear will very quickly recover that Check and his Strength together.

In ſhort, the Experiment and the Succeſs of it, (ſometimes even on large Branches) is ſo well ſupported by repeated Inſtances, that if it is diſcretely and ſeaſonably practiſed, you may depend upon it, that not one in forty will miſcarry. It may eaſily be perceived that this Operation as well as the former one of *Inciſion* or *Plaſhing*, is founded on a well ſupported Maxim: That a *convenient* and *ſeaſonable* Check or reſiſtance of the Sap in its free Circulation, weakens that part, and conſequently makes it prolifick.

The *disbarking* the Pear one would naturally think ſhould kill it; becauſe that Operation kills I think almoſt all other Trees: But the Sap of the Pear, it ſeems, finds a Paſſage thro' the Pith; and ſuch a ſtrait one it is, as admits of only a *gentle* and *gradual* Circulation, ſuch as ends in Weakneſs. *How* and in what manner it is performed, is not yet ſo eaſy to determine for want of nicer Obſervations and Experiments. The Doctrine of the Circulation of the Sap, I think my ſelf and ſome others have undeniably proved from Facts; how it is done, I might *conjecture*; but I chuſe to leave the *ſtronger* Knowledge thereof to *Microſcopical* Obſervations and *Anatomical* Men.

The bearing Buds of a Pear-tree are eaſily diſtinguiſhed from others, even as ſoon as the Leaves fall; being *fuller* and more *ſwelled* than the reſt; which is therefore carefully to be minded, that *they* may be ſpared in pruning. On vigorous Pear-trees there will alway be found ſome ſuch as are called by ſome *Water-ſhoots* or *falſe Wood*, diſtinguiſhable by the Eyes, placed at a greater diſtance, and *flatter* than the reſt; *theſe* as well as all *Autumn Shoots*, muſt be taken away; except neceſſity require them for a vacant Place, and then they ſhould be either *disbarked* as above, or *plaſhed* more than half through.

All *Wood-Branches* that project any thing forward, (as many ſuch there will be) ſhould be cut ſlope-wiſe to a quarter of an Inch of the Branch or Body from whence they ſpring; by which means their following Attempts will be weaker, and they will *puſh* only into *bearing* Wood. Above all things avoid a Confuſion of Branches, and, if poſſible, a croſſing one another in the middle of the Tree, where the greateſt danger is. At the Extremities there is not much difficulty; only a diſcreet Pruner will think it proper to leave one Branch longer, and another ſhorter; that the Wall may be gradually filled with weak Wood. It may be ſeaſonable here to remark, that the *Bon Crétien* Pears of the ſeveral Sorts, eſpecially the *Summer* one, love not the Knife at the Extremities, where they chiefly make their Attempts to reward the Owner. And becauſe they are generally ſuch free Growers, and ſo apt to run into Wood, their Vigour cannot be *too much* check'd, either in the Root or Branches; and for a contrary reaſon the *Buree* Pear cannot well be too much encouraged.

I think, if what hath hitherto been ſaid, be rightly regarded, no one can be at a Loſs how to govern his Dwarfs or Eſpaliers; the ſame Rules (generally ſpeaking) taking place *here* alſo: Only when *Inciſion* or *Plaſhing* is practiſed, a ſlender Support ſhould be applyed, leſt the Winds break the upper part quite off. I cannot approve of the common Practice of too much confining the Dwarfs in low *Concaves*: The Poſture is unnatural and laboured, and is found not to anſwer in the beſt and moſt difficult Sorts. The open Figure and larger Extent of Branches in the *half Dwarfs*, give room to Nature to exert it ſelf; and therefore are much to be preferred to the other for anſwering the deſire of Plenty.

The Trees for Eſpaliers, being placed at the Diſtance of four yards, will ſoon anſwer the Planters Expectations on their *horizontal* Branches; provided they have their proper and occaſional Supports, and the Laws before mentioned be put in Execution. The right Sorts for Theſe and for the ſeveral aſpected Walls, will be mentioned in a proper Place.

CHAP. VIII.

The Fig.

OF late years the *Fig* is come into more Repute than formerly; being found when full ripe to be not only a delicious Fruit, but extremely agreeable to the *Engliſh* Climate. It is moreover a Plant eaſily propagated from Suckers, which it is apt to put out plentifully at the Roots; and having the Shelter of a good Wall, it ſeldom or never fails of bearing a good Crop. It delights moſt in a mixt loamy Soil inclining to Clay, where it will puſh very vigorous Shoots; for on theſe (like the Vine) the Fruit is for the moſt part formed, at the Extremities; and, which is very remarkable, the very Fruit appears in *March* long before the Leaves. This Fruit is known to bear two conſtant Crops every year; tho' with us in *England* it is very ſeldom known that the ſecond Crop comes to Perfection: But in *France* and the more *Southern* Countries, the laſt, which ripens the latter End of *October*, is generally eſteemed the beſt; and its Fruit is thought to have the higher Flavour, as having not been pinched or ſtarved by the cold Winds in the *Spring*; for this ſecond Fruit appears not till *June*.

There are great Varieties of this Fruit in Foreign Parts, but with us not above three Sorts worth planting. *viz.* The round *White* Fig, by much the beſt and earlieſt ripe: The *Violet* or blue Fig, hardy and a good Bearer. And the *Marſeilles* Fig; which is high taſted, but ſmall, and a bad Bearer. Their Management is not difficult, tho' different from moſt other Trees; for tho' the *French* Gardeners and their Editors have led many into Miſtakes, by directing the *pruning* and *ſhortning* the vigorous Branches of this Tree, and at the ſame time own that *there* the Fruit muſt be expected; yet I inſiſt upon it, and know it to be *right* from Experience, that ſuch are not to be touched at the Spring-pruning. At the three or four laſt Eyes the Fruit appears.

In *March* or *April*, what is ſuperfluous and ſmall Wood, ſhould be entirely removed and cut away cloſe to the Body or Branch from whence they proceed: And ſo ſhould even the large Wood that breeds Confuſion. The Suckers which yearly come in plenty from the Roots, muſt alſo be carefully pluckt away, and the beſt ſet in Nurſeries for future Uſe.

The Fig in the Summer doth not love too great Confinement to the Wall; but they are hardly to be preſerved in the Winter without it; therefore it is adviſeable to plant them in ſome warm ſheltered *Corners* of the Wall, where they may the more eaſily be defended with Haulm, Straw, and Mats: But then the Mice muſt be watch'd, leſt they diſbark the Trees. This Care will ſometimes be rewarded with many of the laſt Crop getting ſafe over the Winter, and ripening the beginning of *June*; of which I have often eaten ſome very delicious in the Biſhop of *Salisbury*'s Garden at *Sarum*.

There is this good Rule recommended in the *retired Gardener*, which I ſhall here mention and enforce. *viz.* Nip off the extremity of a young vigorous

vigorous Shoot in *June*; for this will increaſe the Number of Summer Shoots. It will occaſion the ſecond Crop to ripen the better; and it will probably produce more Fruit the next year.

But the moſt effectual way of all others to get good and early Fruit from the Fig, is to plant them in Tubs or Boxes for Dwarfs: By which they may have the Advantage of being preſerved in Winter in Houſes or any other convenient Shelter from exceſſive Froſt. They need no watering in the Winter; but after they are ſet abroad in *April* in ſome ſheltered place, they muſt be well watered at firſt, and afterwards in the hot Weather every two days. They muſt be ſhifted like Orange-Trees into new Caſes every two years, pruning their Roots, and giving them freſh, rich, and loamy Earth; and by this means you cannot fail of good Figs the greateſt part of the Summer. Some have recommended the ſetting a Fig-tree at the bottom of a pretty deep Pit, not excluding any part of the Summer Sun, and yet every way defending it from the Severities of Wind and Froſt: Which with the help of good Soil and artificial Shelters may rationally be ſuppoſed to anſwer.

Some other Fruit-trees improved by pruning, and uſed as Dwarfs or Wall-Fruit, are as follow.

CHAP. IX.

The L'Azarole.

THIS is a Fruit little known amongſt us, till of late years. It is of the *Medlar* or *Service* kind, and produceth a very pleaſant Fruit, in bigneſs betwixt the *Medlar* and *Service*. It is propagated like thoſe, either by grafting or budding on the White-Thorn or Quicken-tree, and is therefore now to be had with moſt Nurſery-Men about *London*.

It will grow and bear very well on Dwarfs, reſiſting even the hardeſt Winters; but it is much improved by a Wall, eſpecially if governed by the general Rules already laid down.

CHAP. X.

The Mulberry.

WE have two Sorts of this Fruit, the *Black* and the *White*. The *firſt*, except in ſome particular Soils, is a very ſlow Grower; but bears a moſt delicious Fruit; tho' it is ſo very tender when it is full ripe, that it will hardly bear carrying without much Injury and bruiſing. The *White* bears but a very indifferent inſipid Fruit, and would hardly be worth planting, but that it is a free Grower, and affords plenty of Leaves for the induſtrious Silkworm. And (as the ingenious Mr. *Bradley* obſerves) the Black Sort ſeldom growing ſtrait, it would be proper to inoculate the *Black* upon the *White* Stock, which would quickly make it an handſome Tree.

This Tree bears Catkins with Male and Female Bloſſoms at the ſame time. It is obſerved to be, of all other Trees, the *wiſeſt*, never puſhing its Shoots till the Froſts are all over. And by the firſt Appearance of its Leaves, ſome govern themſelves in the Remove of their Orange Trees out of the Conſervatory; which is by much a better Rule than the ſuperſtitious One, of the Increaſe of the Moon. It is increaſed either by the Seed ſown in *March*, or by Layers and Suckers; and ſometimes even by Cuttings prick'd in fine Earth and a ſhady place in *April*. It is great pity this profitable Tree is not more encouraged in *England*, where it is generally thought we might have as good Silk made from the Leaves as any that is brought from *Italy*. For there the Silkworms are ſubject to many hazards, and are often ſpoiled by the violent Thunders frequent in thoſe Parts, where they are never ſure of a profitable Increaſe till the Worms have actually ſpun their Silk. But I am told there are great Plantations of theſe Trees already made, with a View of beginning and carrying on the Trade in earneſt; which doubtleſs will prove the Advancement and Support of many Families, as well as a general Profit to our Native Country.

The Fruit of this Tree ripening late, and ſome years not at all, hath tempted many to ſet them againſt a Wall; and doubtleſs if the Tree were managed by Rule, as all Timber Trees ſhould, we might receive its Fruit much *earlier* and *larger*; but I am afraid not *better*: For, as far as my Obſervation hath gone, I find all Fruit, without exception, which will bear and ripen on Dwarfs or Standards, are much better and higher taſted *So*, than from thoſe againſt a Wall. The Wall almoſt always makes Fruit *larger*; but the want of free Air takes ſomething from their Flavour.

Some ſay the Timber of this Tree is as durable as Oak under Water; and the Bark of it makes good Baſt-Ropes. Moreover it is obſervable that it will ſuffer no Caterpiller or Vermin to breed on it, either ſtanding or fallen, ſave only the Silkworm.

CHAP.

CHAP. XI.

The Apple.

THE *Apple* is ſo well known, being planted almoſt in every Farmers Orchard, that were it not for its uſe in Eſpaliers, I might have been excuſed ſaying much of it in this place. There is no Tree that affords more Fruit in the way of Hedges than the Apple; and yet (becauſe it is not rightly underſtood) appears generally leſs fruitful. For what with the Fault in planting, and the Defects in pruning, you find little elſe but confuſed Branches of Wood and Leaves: Indeed every ſort of Apple is not proper, and will not ſo well ſuffer Confinement. The *Codlin*, the *Non Parelle*, the *Kirton-Pippin*, the *Holland-Pippin*, and *Golden-Pippin*, are thoſe I would chuſe for Eſpaliers; and if theſe be planted four yards aſunder, as they ought, and pruned to all the Rules before laid for Pears, (except that one of disbarking all round, which to the Apple is death) there can be no danger of plenty of fair Fruit: And the ſame Reaſoning and Rules hold for Dwarfs.

When I firſt came into the Biſhoprick of *Durham*, I was a little ſurprized to ſee almoſt every where Apple-Trees planted againſt the Walls; and it gave a melancholy Turn to my Thoughts, as if hardly any thing better would grow there. Only I was ſoon ſet right again, when I came to eat ſome of the fineſt and lateſt Peaches and Pears, planted by ſtrong Reſolutions and *modern* Courage. But indeed the Practice of ſetting Apple-Trees againſt the Walls, might be rationally enough grounded, if they were confined to the *North*, *North-Eaſt*, or *North-Weſt* Walls, where they do ſingularly well, and anſwer their end. Becauſe tho' the Winds are not colder, yet they come with a greater and more uninterrupted Violence than in the midland Parts, by reaſon of a manifeſt defect of Wood cut down of late years, and from the narrowneſs of the Neck of Land between the *Weſtern* and *Eaſtern* Sea, from *Carliſle*, to *Newcaſtle*. Except therefore the Caſe of a naturally good Shelter and Situation, the Apples in expoſed Orchards are generally blown down before they are half ripe; and this frequently tempted the Inhabitants to lay hold of the Shelter of a Wall for their Apples: and for want of Knowledge and Experience, they carried the Practice ſo far as to plant even their *South*-Walls with Apples and baking Pears; which are now found to produce ſome of the richeſt Peaches, Pears, and Aprecots.

Some of the aforementioned Apples then being ſuppoſed to be rightly planted againſt *North*-Walls, amongſt the Morella-Cherries and early Plums, an ingenious Pruner will alway contrive to ſuppreſs their luxuriant Growth, and give Room both to theſe, and the Eſpaliers, to ſpread in *horizontal* Branches. However, Experience teaches, that moſt Kernel-Fruit, ſuffer by too free pruning; and by the unskilful Management of the Knife, they are obſerved ſometimes to canker and die. It is therefore more adviſeable, where Neceſſity requires Amputation, to *break off* the Buds, which would produce ſtrong Branches, when they *firſt* appear; rather than leave them to be *cut* from the Tree in Winter. It is eaſy to diſcern in the Spring what Buds will be proper to fill vacant places, and to know ſuch weak ones as are moſt likely to anſwer for Fruit; and this time of *chuſing* and *refuſing* in *May*, will prevent a great deal of future Trouble and Inconvenience: Eſpecially if any of the ſtrong Shoots which are left, be pinch'd off at *Midſummer*, near the Place from whence they puſh, which will throw them into bearing Wood.

Midſummer is the proper Seaſon to tie the Shoots to the Eſpalier, and to disburthen the Tree (eſpecially if it be weak) of its ſuperfluous Shoots. And let not the Branches croud too near one another, that the Fruit may attain its proper Largeneſs and Beauty.

Moſt ſorts of Apples will bear well upon *Half-Dwarfs*, with little Trouble or Care, eſpecially if grafted upon the *Engliſh* Codlin: But every one, who hath ſeen the Beauty and Fruitfulneſs of thoſe grafted upon *Paradiſe-Stocks*, will allow that there is nothing either in the Flower or Fruit-Garden, that can vye with it for its uncommon and pretty Qualities. The *Paradiſe-Stock*, ſo called by the *French*, is properly a *French Codlin*, much more naturally a *Dwarf* than the *Engliſh* one, and conſequently what ſort ſoever is put upon it, is more a *Dwarf* too.

It is about Thirty years ſince it was firſt brought over into *England*, and the Plants were then ſold at 5*s*. a-piece: But now, becauſe it is pretty eaſily propagated from Suckers and Cuttings, they are become not much dearer than our *Engliſh* Dwarfs. They have of late been much encouraged, and deſervedly admired; becauſe as they take up little more Room than many Flowers, ſo they are readily admitted into the Parterres, where they attract the Eyes of their Admirers; whilſt they behold them overſpread with Bloſſoms in the Spring, and laden with inviting Fruit in Autumn.

A great part of their Beauty conſiſting in their dwarfiſh Stature, they ſhould not properly be ſuffered to grow in their extended Branches above ten or twelve inches high; and then ſome of their Fruit may often conveniently be laid upon Tiles like Melons on the Ground. Some think it adds to their Beauty and Prettineſs to ſet them in Pots; where, if they are carefully watered they will grow and bear well; eſpecially the *Non Parelle*. A dozen of which upon one Tree would agreeably ſurprize the Company at the End of an Entertainment, ſtanding on the Table.

CHAP. XII.

The Medlar, and *Quince*.

THE Medlar is of two Sorts. One much larger than the other; the largeſt is beſt and leaſt gritty. It delights in a loamy Soil inclining to Clay, and is propagated by grafting on the *Quicken-Tree* or *White Thorn*. It bears and anſwers beſt, managed as an Half-Dwarf; but it is to be obſerved that its Fruit, contrary to all others, is not properly ripe till it is *rotten* or decayed; and then it is very agreeable to many Palates.

The Quince is one of the *natural* Fruits, which requires no grafting; for it is raiſed from Layers, Cuttings and Suckers. There are chiefly two ſorts of it, diſtinguiſhed by the *Apple* and the *Pear* Quince; the laſt is the faireſt and beſt Fruit, eſpecially thoſe brought originally from *Portugal*. There is hardly any Soil wherein they will not grow, tho' it has been generally thought, that they love *only* a moiſt one. It is a free Bearer, and moſt uſeful Fruit baked or boiled; but by no means to be eaten raw, either with pleaſure or ſafety. The Fruit is often too heavy for its tender Branches, and is therefore apt to be bruiſed or blown down from Standards. I have known it much improved in Largeneſs and Beauty ſet againſt an *Eaſt* or *Weſt* Wall. But the Phyſicians will not allow it to be eaten in any quantities without great Correctives: Which is their Rule for the *Medlar* alſo.

CHAP. XIII.

Of Grafting.

BEFORE I proceed any further in the Management of the *Fruit-Garden*, I ſhall diſtinctly treat of and direct the ſeveral Mechanical Operations, whereby the ſeveral Sorts of Fruits, and their great Varieties, are propagated and increaſed. And indeed without the Benefit thereof, the Buſineſs of the Fruit-Garden would be almoſt at a ſtand, or at leaſt confined within a very narrow Compaſs. Becauſe it is ſeldom that we can get the ſame Fruit from ſetting the Stones of *Peaches*, *Aprecots*, and *Plums*; Nature that way being ſo apt to degenerate; and ſeldomer ſtill from ſowing the Kernels of *Pears* and *Apples*.

This Difficulty originally and from the beginning put the *Curious* upon contriving how to *incorporate* a Branch into a Stock of the ſame Species, and by a Sort of *Marriage* to make *Two* to become *One* Tree. And this hath been contrived ſeveral ways, according as the different Fruits will admit; all of them well anſwering the deſign of a *perfect Union*; and if the Philoſophy of it is not ſo well underſtood, yet it is plain from Experience, that the Nature of the Fruit always follows the Nature of the Cyon, Graft, or Bud, and partakes little or nothing of the Nature of the Stock, which only gives Nouriſhment and ſends up proper Juices to ſupport a *Super-plant*: And if a Stock be grafted ſucceſſively with ten ſorts of Apples or Pears, one upon another; yet the laſt grafted obtains the Privilege of bearing its own Fruit, altho' the Sap is conveyed thro' the Ducts and Veſſels of ſo many different Kinds.

The firſt Contrivance of making this *Union* is by *Grafting*; which is performed, and that with Succeſs, ſeveral ways. The firſt and moſt common way is by *ſlitting* the Stock after the Head is cut off, which is called *Slit-grafting*. After the Head is cut off ſlope-wiſe, and made horizontally even at the Top, chuſe a ſmooth place on the *Weſt* Side, if poſſible, of the Stock, and there make a Slit two or three Inches down the Middle with a ſtrong Knife or otherwiſe. After which, prepare the *Cyon* taken from a vigorous Shoot of the foregoing year, and if it have part of the preceeding year it is never the worſe; with a ſharp Knife *ſlope* it on each ſide from a Bud or Eye, ſo that by a taper Shape like a Wedge, it may conform it ſelf to the Slit in the Stock, and the Bark of both Stock and Cyon may exactly cloſe. The Cyon ſhould not be above four or five Inches long, that after the Clay tempered with Horſe-dung is put round about it, it may appear only with two or three Buds or Eyes; for if it was much longer, the Birds reſting upon it would be apt to diſturb it.

Another way is called *Whip-Grafting*, practiſed where the Cyon and the Stock are pretty near of a Bigneſs; In this way both the Cyon and the Stock are cut with a Slope, and near the end of each Slope both are alſo ſlit, ſo that they may be thruſt down one into the other as with a *Tongue*, ſtill ordering it ſo, that the Cyon and Stock may exactly conform on the outſide, and the end of one Slope may juſt reach the beginning of the other. In this way (and ſometimes in the other alſo) there will be a neceſſity to uſe Woollen Yarn to tye them, and preſerve the Union: And I chuſe Yarn rather than Baſs-Mat, becauſe it *yields* before it will gall, upon the ſwelling of the Stock.

Theſe two ways are uſually practiſed upon Stocks for Pears, Plums, Cherries, Apples and Hollies. But there is ſtill a third way much more ſuitable to the Nature of the two laſt: and that is, to cut off the Head of the Stock ſlope-wiſe as before, and inſtead of ſlitting the Stock, ſlit only the Bark a little above an Inch on the back-ſide of the Slope. After which the Cyon is to be cut with a flat Slope about an Inch long, beginning the Slope from the Backſide of an Eye: Then raiſe the Bark of the Stock where the Slit was made, with a ſmooth piece of Ivory or Wood made ſlope-wiſe as the Cyon, and thruſt it down betwixt the Wood and the Bark, that the Cyon itſelf may readily enter, the beginning of the Slope remaining with a little ſhoulder on the top-ſurface of the Stock. It muſt be clay'd over as before, and as many Eyes left.

The two firſt Operations may be performed on Pears, Cherries and Plums, the latter end of *February* and in *March*; but in the laſt way, Hollies and Apples muſt not be grafted till *April*, when the Sap more freely moves, and the Bark will readily part from the Wood.

There is ſtill another Method mentioned by old Authors on Gardening, called *Grafting by Approach*, as a way of more Curioſity than real Uſe, and hath hitherto been generally confined to Apples, Pears, Plums, and Cherries; ſtill taking it for granted that Peaches and Aprecots can be increaſed no other way but by *Inoculation*; the Method whereof I ſhall preſently deſcribe.

Now altho' *Inoculation* is ſo well underſtood and practiſed, as to anſwer the Purpoſe of the Nurſery-men, except in very dry years; yet becauſe that Method doth not *always* anſwer, and becauſe it is very deſirable to know *all* that Nature will do for us, I ſhall conſent to the Requeſt of my *ingenious*, tho' *unknown* Correſpondent, Mr. *G. Talbot* at *Louvain*, and communicate to the Publick all that paſſed between us on this Subject of grafting even Peaches, *&c.* by *Approach*. And I do it the rather, becauſe in the familiar way of expreſſing ones mind by Letter, there are many accidental Hints let fall, which are not only more inſtructive and diverting, but leave a more *abiding* Impreſſion upon the Mind. His firſt kind Letter is as followeth.

Moſt Honoured and Reverend Sir,

HAVING had ſome years ago the good Fortune to meet with your *Clergyman's Recreation*, &c. I was as much delighted and pleaſed with it as thoſe who made you the moſt early Compliments upon it. Accidentally ſince, changing my Climate, I've made a Remark or two, I flatter my ſelf, may be added to your two Eſſays, and even contribute to the *Gentleman's Recreation*. Not, Sir, that I am ſo vain as to think I can inſtruct you in that noble Art, or (if the School-men allow it) *Science*: But having Obligations to you for your two Treatiſes of Gardening, I thought I could neither better make my Acknowledgments, nor better pay you ſuitable Returns of *Pleaſure* and *Profit*, than by putting a foreign (if not my own) Experiment into your hands; which not only Reaſon but Experience too aſſures me, will with a kind of ἀδερσύνης be an Improvement to the *Engliſh* Nurſery-man, whether Clergy, Gentlemen or Others. Tho' Grafting and Inoculating are the *common*, if not the *only* ways in *England* of raiſing good Wall-Fruit Trees; yet in *theſe* Countries, we now begin to have a *third*, more expeditious and infallible by far than either of the aforementioned, which I term *Nurſing* or *Suckling* young Trees. The Method, Sir, is this. At the time of tranſplanting, we take out of our Nurſeries ſuch Stocks as we have a Mind to improve, and plant them diſcreetly *by* or *under* ſuch Trees as 'tis proper they ſhould have a more generous Alliance with. When the reſpective Grafting Time is come, a Correſpondent Scion's to be taken, and (without cutting it off from the aforementioned Tree) only gently and cautiouſly with a ſharp Penknife, cut off a little of the *Bark on each ſide*, where it is to be fixed in the Stock, by way of *Slit-grafting*; and that it may remain *in Statu quo*, I bind them together with a line, and glaze it over with Bees Wax to keep out the Air. A prudential Number of Eyes may be left above, one, two, three, or four, in proportion to the Vigour of the Tree and Stock; both which collectively nurſe the Scion. And you know, Sir, 'tis ſaid two to one are Odds at Football. I need not by way of Proof aſſure you I have now ſeveral Trees in a flouriſhing Condition, raiſed this way: I am ſure the Inſight you have into vegetive Nature and new Philoſophy (or as ſome term it *Carteſianiſm*) will convince you before you try it, the Experiment will ſucceed. Hence, in Gratitude for your Zeal for the publick Good, and Improvement in Gardening, I make you a Preſent of it. And the Love I bear my Country-men makes me deſire you to give them the Experiment in Print, whether in your own Name or mine, 'tis equal; provided the Publick be advantaged by it, I've got all I deſire, next to pleaſuring good Mr. *Laurence*. We remember in *Autumn* to cut the leading Fibre ſlope-wiſe correſpondently to the Stock below the *Union*; after which it may be tranſplanted either for Standard or Dwarf at pleaſure. *Voici, Monſieur, un Coup d'Eſſai bien rare!* Secondly, Sir, I'm given to underſtand, one may raiſe very good Peaches, Nectarines, and Aprecots, from Stones only; but they are not long-liv'd, and the Stones ſhould come out of a much hotter Climate. This I advance from credible Information. However, that I may have a *Phyſical* and not a *Moral* Demonſtration only of it, I've now actually ſent to *Rome* for ſeveral Fruit-Stones, which I expect will arrive here in *Autumn*. The Soil I am bleſſed with here, I aſſure you, Sir is ſo rich, that laſt Summer I had a *Magnum bonum* Inoculation made one ſingle Shoot of four of theſe Country Ells, which are (you know) three *Engliſh* yards. This I mention, not as material, but only becauſe I do not remember ever to have ſeen in *England* a firſt years Shoot above half ſo long. I hope Sir, my firſt Experiment will make an Apology for this Liberty; and ſhould your Goodneſs be ſo extenſive as to honour me with an Anſwer, you may direct to me at *Louvain, Brabant*; which would be a ſingular pleaſure to,

SIR,

Your moſt obedient Servant,

G. TALBOT.

Mr. *Lau-*

Mr. *Laurence*'s Anſwer.

Worthy Sir,

YOUR moſt kind, obliging, and ingenious Letter I received. I am very well ſatisfied the Study of Vegetable Nature has been very much neglected; and altho' I have broke the Ice, and have given ſeveral ſhort Rules and Hints for Practice, founded upon Reaſon as well as Experience, am ſenſible that it is yet capable of great Improvements, both for the Pleaſure and Profit of Mankind. I am therefore not ſurprized to hear from all Quarters, that ingenious Perſons are much bending their Thoughts that way: And it is in particular with an agreeable Delight, that I read the *Noſtrum* you have been pleaſed to communicate to me; and the rather, becauſe I plainly diſcern you have entirely diſengaged your ſelf from that *Narrowneſs of Soul*, which is the Bane and Hindrance of *all* noble Enquiries into Truth, and is too often an Appendage to Men of a *Profeſſion*, who chuſe to go on in a *beaten*, becauſe they think they cannot go in a better and *ſafer* Path.

What a fatal Stop ſuch a Principle would have made to all the late noble Improvements in Aſtronomy and Philoſophy of all ſorts, I need not ſay to a Man of your Ingenuity and Candor. But altho' the univerſal kind Reception my Books have met with, ſhew that Men of Letters and Senſe will not be ty'd down to Forms; yet how angry are the Herd of the Mechanical Gardeners, that a Clergyman ſhould ſay or do any thing to pleaſe their Maſters? Whereas Bleſſings and uſeful Diſcoveries are not always convey'd in what are commonly thought the proper Channels. It ſhould be remember'd, that the Art of *Gunpowder* was invented by a learned Eccleſiaſtic, and the Art of *Printing* found out by a Military Mechanic. If any thing uſeful is found out, it matters not from what Quarter it comes. Tho' I own I was agreeably ſurprized with your frank and ingenious Acknowledgments, and the Teſtimony of your Love, accompanied with ſuch uſeful Experiments; to which I only ſay here, *Macte virtute tuâ.*

The Method of propagating Fruit-Trees in that way you have deſcribed is pretty; and, if I underſtand you right, may be of uſe to the Nurſery-Men on the account of greater Expedition: But you are aware, that Grafting by *Approach* (which is the ſame which you call *Nurſing* or *Suckling* Young-trees) has been an antient Practice, and is mentioned by *Langford* and others, as of more Curioſity than real Uſe. Only I cannot find that it hath been ever practiſed on any other Trees but *Standard-Fruit*, viz, Pears, Apples, and Plums: Whereas you have brought the Method, it ſeems, to bear (if I take you right) on Wall-Fruit-Trees, Peaches, Nectarines, and Aprecots. If ſo, and that it can be practiſed *ordinarily* in the Nurſery, without crowding the Borders in the Fruit-Garden, with proper Stocks, the Uſe and Advantage will be conſiderable. But then I much doubt, whether in our Climate ſuch a Practice would ſucceed in the open Nurſery, expoſed to Winds and Cold.

When you favour me with another Letter, pleaſe to explain your ſelf on this Head, and whether you begin this Practice in *March* or *April*; and whether alſo it will do on Stocks newly removed; for you know *that* is not ordinarily to be practiſed with Succeſs: But what two to one may do, I can't tell. As to what you have been told about good Peaches raiſed from Stones, it is aſſuredly very right: For all the Variety of good Peaches we have, have been raiſed that way; and I very well know further, that no one ſort of Fruit is more like to anſwer our Expectation of having the ſame Fruit from the Stone than the Peach. But yet neither is this to be depended on: And when the Failure of having a worſe Sort happens, I need not ſay how great the Diſappointment is to them who truſt to a good one in their Fruit-garden. I have already obſerved in my Books, that Nature for the moſt part degenerates. The Seeds of Apples, Pears, Nuts of all Sorts, and beſt Cherries, very rarely prove the Sorts you ſow them; and tho' they are generally and for the moſt part much worſe, yet ſometimes indeed they prove better. This ought to be taken notice of by thoſe who think they are nurſing up a Treaſure, when they have ſowed the Seeds of what they fancy. But neither ſhould this diſcourage any one from trying to *improve* Nature; becauſe *improved* it certainly may be.

I much approve of your Thought of ſending for Peach-Stones from *Rome*, and heartily wiſh you could ſpare me two or three of them to make Experiments here. I have ſeveral things to communicate to the Publick, and when my Leiſure will give me Leave to diſpoſe them, I will anſwer your deſire in publiſhing your *Noſtrum*. In the mean time I cannot but admire the Riches of your Soil and Climate, that hath afforded you ſo uncommon a Shoot from an Inoculation But I need not ſay to you, if ſuch an one was intended for a Dwarf, the beſt way had been to *pinch* it off to about two inches the latter End of *May*, that it might form *more* and *weaker* Shoots.

You may perceive by this long Letter, that I am got upon a Subject I know not how to leave: But becauſe the Letter is to travel a good way, I was not willing it ſhould go empty: And yet it would not be compleat, nor ſhould I acquit my ſelf *a la Cavaliere*, if I ſhould not ſum up the whole with Thanks for the friendly Communication of Yours; aſſuring you that I am,

SIR,

Your much obliged Friend,

and humble Servant,

J. LAURENCE.

Mr. *T.*'s *Second Letter.*

Sir,

FEW Letters have been more agreeable to me than yours, *Auguſt* 4*th*, 1721. As far as I know of the Art of Gardening, it conſiſts more in Practice than Speculation; and therefore we Mechanical Gardeners muſt not be expected to remove Objections: Yet what little Glimmerings I have of Reaſon, I am willing to bend that way, in order to pleaſure good Mr. *L*—— As far as I ſucceed, he'll applaud me; where I come ſhort, his Goodneſs will excuſe me, and accept of the Will for the Deed. Be aſſured, Sir, I have neither read *Langford* nor others about what I writ; their ſaying Grafting by Approach is of more Curioſity than of real Uſe, may ſtifle all further Enquiry among thoſe, who limit their practice to *Langford*'s words. But if Experience proves the contrary, he's caſt; if not, I am. If Apples, Pears, and Plums, can be raiſed this way, Wall-Fruit can too, for the ſame Reaſons, and by the ſame Expedients. Peaches, Nectarines, and Aprecots, I have thus raiſed. The chief hazard I have found, is in tying 'em too faſt, which I preſume ſtopt the Sap's riſing freely, ſo weakened the Shoots; but did not prevent Growth. Hence perhaps tempered Clay may be properer than Flax, where the Scion is weak, and the Stock ſtrong enough to hold it in the fix'd Poſture. Where Flowers are preferred to Trees, 'tis reaſonable they ſhould enjoy the Royalty; where Trees are preferred to Flowers, why may not they have the ſame Privilege? Crouding of Borders, 'tis true, is a great Eye-ſore, if not falſe Heraldry: And two Bodies, if we believe good Authors, cannot be in the ſame place at the ſame time; yet under a large Aprecot-Tree we can have *Tulips*, *Gilly-flowers* or *Pinks*, tho' the Stem of it runs into the middle of the Border; cannot then, from a ſtronger Argument, a young Stock, which is to be removed again in *Autumn*, be ſet cloſe to the Wall behind the Pinks? I've found this true from my own Practice. No body doubts but Grafting and Inoculation will ſucceed in open Nurſeries expoſed to Winds and Cold. Experience proves thoſe Operations can abundantly be defended from the Weather. Whatever Precautions any Nurſery-man takes in this, the ſame he may if he pleaſes in my Caſe, and with more Succeſs; for two to one are odds. I need not inform you when to begin this Practice; you know an open Winter accelerates the Spring, and long and hard Froſts retard it. Yet this is certain, that Wall-Fruit ſhould ſooner be grafted by *Approach* than Apples. Doubtleſs Stocks removed in *Autumn* are better diſpoſed for growing, than in the *Spring*; yet I've try'd both with Succeſs. Upon the whole, I do not in the leaſt doubt, but when you try my Method of *Grafting* Peaches, *&c.* it will ſucceed. I've remarked, that even when the *Stock* is dead, the Scion will make an handſome Shoot, being nouriſhed only from its Mother-Tree. 'Tis true, this is to no Effect; yet even from ſuch a Failure, I think one might frame a ſtrong Argument in Confirmation of what I have advanced: But I need none ſuch; ſince ſucceſful Experience has put the thing out of doubt at *Louvain*.

I muſt beg you'll excuſe haſte and all faults, in which you'll highly oblige,

SIR,

Your very humble Servant,

G. TALBOT.

The Anſwer.

Worthy Sir,

I Am extremely obliged to you for your laſt kind Letter, which came ſafe to my hands. You rightly obſerve, that the Art of Gardening conſiſts more in *Practice* than *Speculation*; and therefore if the Mechanical Men would but be perſuaded to leave ſometimes the *beaten* Road to make Experiments, we might expect great Improvements in that Science. However,

ever, Reaſon and Speculation are the great Incitements for *Practical* Knowledge. As therefore Practice cannot well be ſeparated from Speculation, ſo Speculation alone ſhould never make any Appearance in the World till it is confirmed by Practice: Inaſmuch as I could give you ſeveral Inſtances of Things certainly true in *Theory*, which are falſe in *Practice*. But when Speculation and Practice are diſcreetly joined, they make a noble and uſeful Syſtem in any Science. I have my ſelf done ſomething in this way, and I believe have put Men of greater Leaſure and Ingenuity upon the Study of Vegetable Nature, in order to make Experiments.

Would my Buſineſs give me Leave, and had I but Elbow-room, I have a great Inclination to turn *Quack* in Vegetables, and to ſay ſomething about the Nature and Cure of Diſeaſes amongſt Trees; concerning which I have made Obſervations for ſeveral years: Some of which Diſeaſes, analogous to thoſe in human Bodies, I find to be *curable*, and others *incurable*. There is alſo plainly a further Analogy even in the Nature of their Diſtempers; for ſome Fruit-trees are ſubject to the *dead Palſey*; ſome to the *Yellow Jaundice*; ſome to the *Meaſles*; others to the *Diabetes*; and not a few to the *Conſumption*. But whither am I running in a Letter ——?

I doubt not at all of the Succeſs you have had in your way of grafting Peaches, *&c.* by way of *Approach* or *Inarching*, which I have ſince heard has been introduced in many Places: And if it was ſuppoſed not to be better or more expeditious than the common Practice; yet I think we ought to know all that Nature *will* or *can* do for us.

You are exceeding kind in ſparing me ſome of your Peach Stones from *Rome*; and therefore I cannot conclude, without repeating my Thanks to you, for your kind and generous Communications and Preſents. I wiſh it lay in my power to make you any ſuitable Return. In the mean time I deſire you to believe that I am,

Your much engaged humble Servant,

Sarum, Nov. 9. 1721.

J. Laurence.

Since the Receipt of theſe Letters, I have been informed that of late ſeveral have practiſed this Method in *England* with Succeſs, and ſo 'tis probable 'twill now ſoon become familiar. And as there are ſome *Seaſons* and ſome *Caſes* pretty difficult in the ordinary way of Inoculation, this of Grafting by *Approach* will be found to be very uſeful and advantageous. To ſay nothing of the difficulty of Inoculating in dry Summers, ſome Peaches are very hardly brought to an Union with the Stock; as particularly that incomparable Peach newly raiſed, called the *Royal George*, which will not be perſuaded to incorporate with any of the common Plums, Peach or Almond Stocks; but in this way of grafting by *Approach* in the Spring, there ſhould ſeem to be no Difficulty. However, I have been told that in the way I have *formerly* [a] recommended of putting an Aprecot on the Muſcle Plumb, and then by inoculating this Peach upon the Aprecot, it will readily take. One way or other 'tis to be hoped it will be made *familiar* to every *rebellious* and *ſtubborn* Nature.

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[a] *Gent. Rec. Pag.* 96.

CHAP. XIV.

Of Inoculation.

THIS is a pretty practical Amuſement in Gardening, invented to aſſiſt Nature in her generous Inclinations to afford Mankind every thing pleaſant and profitable, for where Grafting fails and will not take place, this of *Inoculation* amply ſupplies the Defect: and is performed alſo in ſuch Summer-Seaſons as makes it entertaining, ſafe, and pleaſant; and for that reaſon is preferred to the former, which too often ſubjects the Operator to cold Weather, wet Feet, and dirty Hands.

The Method of performing it is this: Cut off a Summers Shoot from a Tree you covet, any time a Month *before* or a Month *after* Midſummer; not *in* a wet, but *after* a wet Seaſon is beſt. Then chuſe a Smooth place in your Stock (which ſhould not be above four or five Years Growth) making a perpendicular Slit in the Bark, ſomething above an Inch long, and another croſs-wiſe at the bottom of that, in the form of an inverted ⊥; then with a Knife roundiſh at the point, and keeping one Hand ſteddy, with the other gently looſen the Bark of the Wood on both Sides, beginning at the bottom; but be very careful not to raze any part of the Wood, for *that* would ſpoil all. Your Fruit-branch being ready at hand, from ſome of the middle part of it, cut off with a ſharp Penknife one of the Buds or Eyes a little more than an Inch-long, entring with the Knife ſomething into the Wood of the Branch, as much *above* as *below* the Eye. After the Bud is thus cut out, immediately with the point of the Penknife and your Thumb take out the *woody* part of the Bud, and if in doing that you diſcern the very Eye of the Bud come away (as ſometimes it will) reject that, and try another inſtantly. Then ſlip this Bud in between the Bark and the Wood of the Stock at the Croſs-ſlit already opened, leading it up by the Stalk where the Leaf grew, till it falls in at the bottom and ſo exactly cloſes.

This done, bind it about with coarſe Woollen Yarn, that all the Parts of it may cloſe exactly, and the Bud incorporate itſelf with the Stock, as it will do in about three Weeks time; and then you muſt looſen the Yarn that it may not gall the Place too much.

This Operation is beſt and ſafeſt, when performed in cloudy Weather, or at leaſt in an Evening, that it may get a little Strength before the Return of the Sun. But obſerve the quicker it is done, the better the Work will ſucceed. After a little practice it will ſoon become ſo familiar, that many Inoculations may be done in an Hour. However it is adviſeable to put two or three Buds into one Stock, not juſt one over another, that in caſe of accident, you may be the ſurer of one to ſucceed. If you begin this Work early, and the Bud fails, you may make a ſecond Attempt the ſame Year. For ſometimes, when a change of Fruit againſt a Wall is wanted, a Diſappointment *there* is very undeſirable; and therefore the ſooner the End is attained the better.

Peaches, Nectarines, and Aprecots, are not to be raiſed, and admit of no Union with the Plum or Almond, but by Inoculation, (except in the Caſe of grafting by *Approach* as above) and yet I think no Fruit refuſeth this Operation. The Apple, by reaſon the Bark doth not ordinarily well part from the Wood, doth not readily ſubmit; but yet I have frequently propagated Apples this way, if the Attempt were made upon young Wood. The Cherry, Plum, and Pear, almoſt never fail to anſwer in Budding: Whereas very often the Coldneſs of the Spring deſtroys the *Grafts*, even ſometimes after they are put forth.

Any time between the Beginning of *June* and the latter End of *Auguſt* moſt Fruit may be inoculated, and ſometimes Pears even in *September*. But it muſt be taken notice of, that the Branch or Shoot taken from a Fruit-tree to inoculate with, muſt not (as in the Caſe of Grafting it may) *lie by* any time; but ſhould be preſently made uſe of, as above.

All the variegated Hollies, that make ſo beautiful a Figure in the Parterre are beſt propagated by Inoculation; and ſo are the ſtrip'd Philereas and Jeſſamins, as well as Oranges and Lemons. And now I mention the Jeſſamine, I cannot forbear repeating what I have already communicated to the World, *viz.* The noble and certain Demonſtration of the Circulation of the Sap, by Inoculating the Yellow ſtrip'd Jeſſamine on the plain one; whereby not only that Branch, but the whole Tree becomes ting'd and variegated, as the Sap in its Paſſage down to the Roots and up again to the Branches gradually *dies*, and as it were *poiſons* the Wood and Leaves. About three Weeks or a Month after Inoculation, when you come to unbind, you may quickly diſcern which are good and have *taken*, and which not; for the Good will appear verdant and well coloured, and the other dead and withered. In *March* following, you muſt cut off the Stock three Fingers above the Bud; otherwiſe it will make none or a very weak Shoot. The next Year it is to be cut cloſe, that the Bud may cover the Stock, as Grafts do.

Methinks I ſhould not need to add, that Diſcretion muſt guide the Operator, when he Inoculates. For Dwarfs muſt be budded very near the Ground, that they may anſwer their end when they come to be removed out of the Nurſery; whereas Standards ſhould be choſen from the ſtraiteſt Stocks, and budded five or ſix foot high. *N. B.* Inoculating ſome of the ſmaller and more diſtant *Roots* of Plums, Pears, *&c.* hath been practiſed with Succeſs.

CHAP. XV.

Of Seminaries, the beſt Method of ordering them and furniſhing them with proper Stocks for Fruit.

ALtho' I always take it for granted that every Gentleman coming to, or poſſeſſed of an Eſtate is ſo wiſe, as not to be willing to loſe *any* part, much leſs the *beſt* Part of his Life in waiting for Fruit-trees yet to be raiſed out of a Nurſery; but will furniſh himſelf without Loſs of Time from the beſt Nurſery-men near *London*; yet for as much as in a Fruit-garden of ſome Extent there will be always ſome Vacancies to be filled up, either thro' Omiſſion, or Misfortune, or Accident, it is very adviſeable to have a Nurſery of young Fruit-trees always at Hand to ſupply thoſe Defects as Occaſion ſerves, without the Trouble and Charge of going to Market.

For which Purpoſe then, a ſmall piece of Ground well mounded about with either Hedge or Wall, ſhould be choſen, not lying too wet, and of a mixt Soil, and if poſſible, well defended from the Weſt and North Winds with Trees of ſome Bigneſs. This is to be prepared by digging or plowing in the Beginning of *October*, or ſooner, and afterwards harrowed and made fine, cleaning it well from Weeds and Roots.

Lay out your Seed-beds with a Line three Foot wide, and leave a Path of two Foot betwixt every Bed, as a Liberty to go between them to weed; and keep a diſtinct Bed for every ſeveral Sort of Fruit; the Memory whereof ſhould be preſerved in a Plan of Paper, wherein the Beds and the ſeveral Seeds ſown may be expreſſed, as before in the Caſe of the *Fruit-garden*.

The Stones of Fruit ſhould be carefully ſet in Rows, with the ſharp End uppermoſt, three Rows in a Bed three Foot wide, and about two Inches aſunder. I chuſe to ſet them pretty thick, becauſe the Stones, eſpecially of Plums, are very apt to miſcarry. For which Reaſon I follow Nature, and ſow them rather as Nature directs than in the common Way of ſaving them till the Spring in Sand; that is to ſay, as they fall from the Tree when perfectly ripe, and that with the Pulp on. The Sorts you are to ſet for Peaches and Aprecots ſhould be of the larger Kinds, the Muſcle, the Pear-Plum, the red and white *Bonum Magnums*, and the black Damask: But becauſe the Stones of Fruit generally follow the Nature of the *Stock*, the Stones ſowed ſhould be taken from ſuch Trees as have not been grafted.

But the more expeditious Way is to get Plants or Suckers out of the Woods, where they are ſometimes found in Plenty: But the *Suckers* ſhould have one or two Removes, and be trim'd from their Spawnings; otherwiſe they are apt to be troubleſome with their numerous Suckers afterwards. The Stocks for Cherries are alſo to be raiſed from the Stones of the *black Cherry*, or from their Suckers out of the Woods, where they are plentiful enough; but no other Sort is ſo fit either for grafting or inoculating as *that*.

The propereſt Stocks for Apples and Pears are to be raiſed in the Nurſery from the Kernels, and ſown by themſelves on the aforeſaid Beds in *October*, which is beſt and moſt expeditiouſly done, by ſowing the very *Pouze* or *Muſt*, the Subſtance of the Fruit, of which Cyder, Verjuice, or Perry is made. They will very freely grow, diſcreetly ſown in that manner, and quickly reward you with Plenty of good Stocks for Fruit, as well as a Store of Plants to mend Gaps in Hedges: But there ſhould be a careful Regard had to deſtroy the Mice, which are apt to devour theſe Seeds.

Hollies and Yews being ſuch great Ornaments in every Garden of Pleaſure, *they* ought to find a Place in this Seminary for Fruit; becauſe they will not quickly overtop, or any way incommode the Nurſery. But their Seeds not coming up the firſt Year (to prevent the trouble of weeding) they may be laid by in any Corner in a Heap of Sand for one Year, and at *October* following may be regularly ſown in the Beds as above; and tho' they are ſlow in their Growth for two or three Years; yet if they be kept clear of Weeds, will after that make great Haſte, and quickly reward the Planter with Pleaſure and Profit.

It may not be amiſs to let ſome Peach and Almond-ſtones have a Place in this Seminary; not only by way of Tryal to raiſe new Sorts, but alſo for Stocks for Peaches; for altho' they do not make laſting Trees, yet they admit Inoculation ſomething readier than the Plum.

CHAP. XVI.

Concerning the ſeveral ſorts of Stone-fruit, how to diſpoſe them, whether for Walls, Dwarfs, or Standards, their Deſcription, their Order and Time of ripening.

ACcording to the conſtant Obſervations I have made of the Miſtakes committed in the Diſpoſition of Fruit-trees, I think my ſelf obliged to be particular on this Head, and if poſſible to give ſuch a clear and diſtinct Account of their Nature, Properties, and Uſe, that we may no longer hear of Complaints and Diſappointments for want of Information and Knowledge.

Of Peaches and Nectarines.

There is no Sort of Fruit which affords us greater Varieties than the *Peach*, which tho' in the *Weſt-Indies* it grows and bears on Standards and Dwarfs to great Perfection; yet in *England* I think it is ſeldom ſo miſtaken as to be planted any where but againſt a Wall, tho' that Wall be not ſometimes ſo good as it deſerves, the Climate and Nature of the

Soil conſidered. Nay indeed ſome of the beſt and tendereſt Peaches and Nectarines will not do at all in a Situation unguarded, and a Soil wet and cold, in whatſoever Latitude the Place is; and therefore I think ſhould not be attempted; but their room taken up with *hardier* Fruit; being ſtill of Sir *William Temple*'s Mind, that *a good Plum is better than a bad Peach.*

I ſhall here ſelect moſt of the known and valuable Kinds, deſcribing ſomething of their Nature, with the Order and Time of their ripening, that ſo every one may diſcretionally judge for himſelf, what to chuſe and what to refuſe.

But becauſe I ſhall begin with thoſe, which are firſt and earlieſt ripe, I think it proper to take this Occaſion to ſay what I have all along obſerved to be true, and is (as I take it) a Rule without Exception; that all the *Præcoces* of every kind of Fruit, whether ſtone or kernel Fruit, *i. e.* every Sort of Fruit that ripens much ſooner than others of the ſame Species is the *worſt*, and wants ſomething of its *proper Flavour*, and moſt commonly of its *natural Bigneſs*. Accordingly,

White and red Nutmeg. The white and the red Nutmeg Peaches make their firſt Appearance with the Name and ſomething of the Taſte of a Peach; but have little elſe to recommend them, but that they ripen the biginning of *July*, and ſometimes ſooner in a good Seaſon; and if they be planted againſt a Wall, which they do not deſerve. But where there is room, theſe commonly find a Place.

Ann-Peach. The *Ann-Peach*, not ſo named from Queen *Ann*, but Mrs. *Ann Dunch* of *Berkſhire*, who firſt gave it Birth, is much commended by Mr. *Switzer* for its early ripening the beginning of *Auguſt*, and good Taſte.

Royal George. The *Royal George* is an excellent Peach, but lately known; deſerves the beſt Aſpect, and is ripe in *Auguſt*. I have already obſerved that it is very hard to be propagated by Inoculation, except on an Aprecot.

White and red magdalen. The *white* and *red Magdalen* are valuable Peaches in warm Soils and well expoſed. The *laſt* differs from the *firſt* by its later ripening, and by its Redneſs at the Stone, which readily parts from the Pulp, which is rich and ſweet. They have large Leaves, and much indented, with ſhort and round Stones; the white is ripe about the latter end of *Auguſt*, and will do on an Eaſt Wall a little inclining to the South.

Minion. The *Minion* Peach is by many admired for a good Bearer, for its Largeneſs and Beauty: And were it not ſometimes apt to eat a little flat, it hath a very firm and melting Pulp. Is ripe ſometimes before the former, and therefore will do on an Eaſt or Weſt Wall. This is ſaid to have been a great Favourite of one of the Kings of *France*, and the *Word* is now accordingly uſed metaphorically.

Alberge. The *red*, the *yellow*, and *violet Alberge* are all good Peaches in *Auguſt*.

Burdine. The *Burdine* is not inferiour to any of the former. It is not haſty to bear, but when it begins it amply makes amends for that Fault. For about Midſummer it muſt be diſburdened of many, that the reſt may attain their agreeable Beauty and Taſte. Ripe alſo in *Auguſt*.

Montabon. The *Montabon* uſhers in the next Month of *September* with one of the beſt Peaches we have; for it is beautiful, high-taſted, hardy, and a never-failing Bearer on a South-Eaſt or South-Weſt Wall. It is pretty ſtrange that Monſieur *Quinteny*, who was ſo good a Judge of Fruit, ſhould leave this, (which excels moſt of its Seaſon) out of his Catalogue.

Belle Chevereuſe. The *Belle Chevereuſe* is a Peach that ought to have a Place among the Curious, for it is a good Bearer, and the Fruit is beautiful and of a ſugared Juice. Its Shape is rather *long* than *round*, deſerves a good Wall, and in that Situation is ripe the beginning of *September.*

Nobleſs. The *Nobleſs* is I think univerſally eſteemed *amongſt us* one of the beſt Peaches. For its good Qualities, of largeneſs of Size, rich Taſte, and plentiful Bearing, is not *exceeded*, ſome think hardly *equalled*, by any, and therefore it deſerves a good Expoſition, and kind Soil; by which Means it appears in Perfection in *September.*

Admirable The *Admirable* comes in alſo the beginning of *September*, and challengeth his Name, as having almoſt all good Qualities, and no bad ones. It is round and large, hath a ſcarlet Coat, delicate Pulp, ſugared Juice, and an high and exquiſite Taſte.

N. B. All the foregoing Sorts (according to the Diſtinction the *French* rightly make between *Peaches* and *Pavies)* are properly ſpeaking *Peaches*; that is, ſuch as part from the Stone, and are of the more *melting* Nature. *Theſe*, indeed are in ſuch Eſteem among the *French*, that the *other* which are called *Pavies* are very little ſet by, and are accounted watry and inſipid. But without complementing away our Palates, the *Engliſh* venture to abide by their Judgment, when they ſay we have two or three *Pavies* of *Engliſh* Extraction, which equal, if not exceed any of the foregoing good Sorts of *Peaches.* As for Inſtance,

New Newington. The *New Newington* being a Week ſooner ripe than the old one, challenges this firſt Place in Order amongſt the *Pavies.* It is a very fair and beautiful Fruit, and in ſome Years not much inferior in Largeneſs and Taſte to the other. But yet,

Old Newington. The *Old Newington* is a Fruit which the *Engliſh* juſtly glory in and deſervedly boaſt of, as being not only a Native of our own, and of an antient Family; but hath really all the Virtues and good Qualities that can be ſuppoſed to give Pleaſure and Satisfaction to thoſe that love Merit. It is a diſgrace to it to be planted in a wet Soil or cold Clay; for *there* it will neither proſper nor bear good Fruit; But if it hath Juſtice done it, and it be planted in a warm Soil and good Expoſition, ſuch as *South* or *South-Eaſt*, you may expect to be rewarded every Year the Beginning of *September*, with ſome of the moſt delicious Fruit a Garden can afford. For beſides the Beauty of its moſt tempting Bluſhes, when it firſt changes Colour it afterwards affords the *Taſte* the beſt and richeſt ſugar'd Juice, with a Pulp of the higheſt and moſt vinous Flavour. In ſome Soils and Situations it will grow exceeding large: But it is always a *Bonum magnum.*

Of the Nectarine kind or ſmooth Peach, which the *French* call *Brugnon* we have ſome excellent Sorts; and valuable Fruits they are. As,

Roman Nectarine The *Red Roman Nectarine*, large and red all over. It has a firm yellow Pulp; And if it is ſuffered to hang on the Tree till 'tis full ripe, as it ought, it is very full of Juice and hath a vinous Taſte, which gives almoſt univerſal Satisfaction to thoſe who taſte it about the Middle of *September.*

Elrouge. The *Elrouge Nectarine* comes in alſo at the ſame Time, and being of *Engliſh* Extraction has been very much eſteemed for its ſoft melting Pulp and vinous Taſte. But it muſt give place to the, *Newing-ton Nectarines.*

Newington Nectarine, which is now generally reckoned the moſt valuable and the beſt of Nectarines in all its Qualities for Bearing, high Flavour and richneſs of Juice. It takes its Name from the Reſemblance the Flowers have to thoſe of the *Newington* Peach, and is ripe about the ſame Time.

Dutch tawny.

There is alſo a *Dutch tauny Nectarine* much admired for its Size and high Flavour, if ſuffered to hang on the Tree till 'tis rivelled the latter End of *September*.

All theſe are yet ſucceeded by ſome others both *Peaches* and *Pavies*; But becauſe theſe *late* Sorts are difficult and uncertain, I chuſe not to tire the Gardiner, or burthen this Catalogue with any more but this one Sort of Pavie, which for its excellent Qualities, ought always to be admitted. *viz.*

Katherine

The *Katherine*; which though it ripens not till the middle of *October*, is then a moſt excellent Fruit, and juſtly valued by all who know it. I need not ſay it requires the *beſt* Wall you can give it, becauſe it ripens late: But with that advantage we have ſeldom ſuch Seaſons even in the North, but that it makes an inviting Part of an Entertainment when the reſt are gone. The Fruit is large and very beautiful, only ſometimes it is bigger on one Side than the other, which makes the *flatter* Part a little inſipid, even whilſt the *rounder* Side is good and well taſted. It has one other good Property, that it will keep ſeveral Days good after it is gathered, if laid up dry.

CHAP. XVII.

Aprecots.

ALtho' the *French* deſpiſe the *Aprecot* as mealy and inſipid, and fit only for *Compotes*; yet in *England* with good Management we find it an excellent Fruit, and therefore uſe it with the ſame Care and Art as we do the *Peach*; only they will do on Walls Eaſt or Weſt, that have leſs Sun. There are not a great many Sorts of this Fruit.

Maſculine Aprecot.

The *Maſculine* or early Aprecot is that which makes its firſt Appearance near a Month before any of the reſt, even in the middle of *June*. But according to the Obſervation before laid down, being a *Præcoce*, it is much *worſe* than any of the reſt; and indeed finds a Place againſt a Wall only for its early ripening. A ſingle Tree is enough for the Curioſity; for it is tender, and yet ſmall, mealy and inſipid, when perſuaded to bear; wherein yet it will often fail, by reaſon of its early Blowing, and the Froſts in *February* and *March* overtaking its tender Bloſſoms.

Orange.

The *Orange* Aprecot appears next, and is ripe ſome Years the firſt Week in *July*. It has a good vinous Flavour, if not ſuffered to be too ripe; but it Cares not to part from the Stone, which with ſome is reckoned a Fault. However it is no bad Bearer, and uſhers in

Turkey.

The *Turkey* Aprecot, univerſally eſteemed for its Hardneſs, conſtant Bearing, Largeneſs, and high Taſte, if gathered and eaten as ſoon as ever it will part from the Stone. For indeed it is the Fault, ſhall I ſay, or Miſfortune, of every ſort of Aprecot; That if it be neglected and ſuffered to hang on the Tree too long, it will be flat, mealy and inſipid: But yet this is leaſt ſubject to that Inconvenience, provided the Avarice of the Gardener ſuffer not too many to remain after *May* Day, which as it is the *Root of all Evil*, ſo it is the Foundation of this. This is ſo hardy and kind, that ſome Years I have had a Succeſſion of them from North-Eaſt and North-Weſt Walls extremely good. There is alſo a Roman and a large Dutch; but,

Breda. I ſhall only add to this Catalogue, the *Breda* or *Bruxels* Aprecot, famous and much valued for its bearing on Dwarfs or Eſpaliers. And it is obſerved when they are managed with Art in that manner, they afford a pretty, vinous, and high-taſted Fruit in *Auguſt:* They will crack like a large round yellow Plum, and are ſpeckled with little red Spots: They eat much better from the Tree than any of the Sorts before mentioned; inſomuch that I have often wondered it is not more planted and encouraged; ſeeing the Tree is contented with the Place and Stature of a *Plum:* But it muſt be ſet in a warm well-ſheltered Place; the want of which perhaps hath occaſioned many Diſappointments.

CHAP. XVIII.

Of Plums.

THERE are vaſt varieties of this Fruit, and many good ones, one or other continuing in Seaſon no leſs than four Months. The beſt Sorts are a pleaſing and delicious Fruit, though perhaps not ſo wholeſome eaten in any Quantities. The chief and beſt take in order as follow.

Haſtive. and Mirabel. The *Haſtive* and *Mirabel*, are two *Præcoces*, and are only valued accordingly as they ripen in *June* and *July*. Of which number is alſo the *Black Damaſk*.

Drab d'Or. The *Drab d'Or* is a ſmall round yellow Plum, whoſe Coat is ſpeckled with red. It has a delicate Sugar'd Taſte. Will do well on a Dwarf; but will bear better againſt a Wall, where it will ripen the latter End of *July*.

Maitre Claud. The *Maitre Claud* is a large whitiſh Plum, having a briſk tho' ſweet Juice, and comes from the Stone; will do on Dwarf or Wall, is reckoned amongſt the beſt Plums, and is thought to deſerve an Eaſt or Weſt Wall.

Blue Perdrigan. The *blue Perdrigan*, is juſtly valued as the very beſt of Plums; and becauſe it is not very apt to bear well, being tender in the Bloſſom, it juſtly deſerves a good Wall. It is in vain to plant it either Dwarf or Standard: But on a South Wall and warm Soil it will reward the Owner with the moſt delicious high taſted Fruit of this Seaſon of *Auguſt*.

Royal Plum. The *Royal Plum* is ripe alſo in *Auguſt*, will bear on a Dwarf, but more certainly againſt a Wall. It is large and round, and of a lively red Colour, eſpecially on the Sunny ſide. It hath a ſweet and fleſhy Pulp, and is I think in all its qualities inferiour to none.

Rich-Corbon is a round middle ſized Plum; hath a firm Fleſh, and a moſt exceeding briſk vinous Juice. It doth not part from the Stone; but it is one of the beſt Plums, and would be more eſteemed if it was a better Bearer, which Fault is yet mended againſt a good Wall, and in a warm Soil.

White Perdrigan

The *white Perdrigan* is little inferiour to the Blue, ſomething bigger and a better Bearer, even againſt an Eaſt or Weſt Wall, and is the more to be valued and encouraged, becauſe it ſucceeds the other.

Imperatrice.

The *Imperatrice* in Shape and Colour is like the *blue Perdrigan*; but comes later. It ſticks faſt to the Stone, and hath a delicious Flavour, tho' it is ſo bold as to hang upon the Tree againſt a Wall till the beginning of *October*, and if carefully gathered and laid ſingle upon dry Shelves, will keep a great while in the Houſe.

I need not ſay there are ſeveral other good Plums, well known; and therefore want no other Recommendation or Deſcription, but giving them a Place in the Catalogue of good Plums, ſuch as will bear well on Dwarfs, Standards, or Northern Walls. Such as theſe,

The *Red Bonum magnum.*
The *White Bonum magnum.*
The *Orleans*
The *Fotheringam* or *Sheen.*
The *Muſcle.*
The *Queen Mother.*
The *Damaſcene.*
The *Violet.*
The *Green Gage.*
The *Morocco.*
The *Aprecot-plum.*
The *Damſen white* and *black.*

N. B. The Pulp of all Plums is Yellow.

CHAP. XIX.

Of Cherries.

THIS is a Fruit ſo well known every where, that it needs no Deſcription or Recommendation: But becauſe there are ſeveral Sorts of them, it may be neceſſary juſt to mention thoſe which are generally eſteemed beſt, and good Bearers. The firſt ripe is,

The *May-Cherry*, which being a *Præcoce* is valued only for its Earlineſs: For it is Small, and apt to be taſtleſs and inſipid. If it is ſet againſt a South Wall; it will be ripe the very beginning of *May.*

The *May-duke* appears next, and with a good Wall will be ripe the Middle or latter End of *May.* But it never appears with its true Beauty and Taſte, but on a Standard; whereon it bears admirably well, and will be ripe in *June*; when I have ever eſteem'd it to have all the good Qualities of a Cherry and none of the bad ones. It hath a ſmall Stone, a delicious full Pulp, and is moreover almoſt a never failing Bearer. So that were it not deſirable to have a Suceſſion, there ſhould no other Cherry but this be planted. But for that reaſon it is adviſeable to have alſo,

The *Orleans*, which is a very good Cherry, and bears well, either Wall or Standard: And ſo alſo is the *Bleeding-Heart*, *White-Heart*, and

Carnation: But all of them have large Stones and little Pulp: And the three laſt are very uncertain Bearers without the Advantage of an Eaſt or Weſt Wall.

Merella Cherries are excellent Bearers, and are good, when throughly ripe the latter End of *Auguſt*, either eaten raw, or put into Brandy, and made into Compotes. They are beſt eaten off from Standards; but they grow large, and well deſerve a Place againſt a North-Wall.

Every one knows the common *Flemiſh Cherry* to be good from Standards, and are pretty conſtant Bearers; but when they are ſet againſt a Wall, tho' they grow larger, they are made ſour and ſpoilt for eating raw.

The *Black Cherry* which grows to Timber and large Trees, every one alſo knows to be ſweet and good. It is raiſed from Seed and common Foundation for all other Cherries to be grafted upon. There are found of them in ſome Places, particularly at the Rev^d. Mr. *Butlers*, at *Stanhope* in the Biſhoprick of *Durham*, a Sort having a very large Fruit, little inferiour to the *bleeding-Heart*, and a much better Bearer.

There is alſo the *Amber*, the *Black-Heart*, the *Cluſter* and the *Morocco*; but they are not much encouraged, becauſe they are bad Bearers.

CHAP. XX.

Of Kernel-Fruit, ſuch as Apples, Pears, &c. How to diſpoſe them; whether for Walls, Dwarfs, or Standards, their Deſcription, Order, and Time of Ripening.

Of the Pear.

I Have already directed the Government and pruning this valuable Fruit, and I am now led to the Deſcription and Properties of the ſeveral *Sorts* of Pears. And this is the more neceſſary to be done, becauſe no Sort of Fruit hath been generally more miſtaken and leſs underſtood, to the great Diſappointment and Grief of thoſe who have been miſled in planting and placing them. There are almoſt infinite varieties of Pears; and it muſt be owned, that though we may and do exceed the *French* in the Art of managing and pruning the Trees; yet we are beholden to them for ſome of the *beſt* Sorts, thoſe eſpecially that require a good Wall. In this Deſcription I ſhall ſelect all or moſt of the *beſt* in the Order as they ripen: Only ſuch as ripen in *July*, being *Præcoces* and valuable only on that Account, I ſhall ſatisfie my ſelf juſt to name them, and proceed to the more valuable which follow in *Auguſt*.

July *Pears are,*

The *Primate* or *Petit Haſtive.*
The *Little Muſcat.*
The *Couſe Madam.*
The *Muſcat Robert.*
The *Great Blanquet.*
The *Long-tailed Blanquet.*

To anſwer the End of having theſe early, they may be ſet againſt Wall, which will haſten their ripening, but not make them better.

Auguſt *Pears are,*

The *Jargonel.* This is, I think, the firſt Summer Pear that can be called *Good:* And indeed a large, beautiful and well taſted Pear it is. It has moreover the Property of bearing very well; and becauſe it is large and apt to fall from the Tree, it ſhould not be ſuffered to continue on the Tree till it is full ripe. It well deſerves an Eaſt or Weſt Wall to keep it. *Jargonel.*

Hamden's Bergamot is of a flat Shape, tinged with Red on the Sunny Side, and hath a rich Juice, and bears beſt on a half Dwarf. *Hamden's Bergamot.*

The *Orange Bergamot* is a Pear generally admired for its ſhort Pulp and its rich, ſugared, perfumed Juice. It is an excellent Bearer, either againſt a *Wall* or on a *Dwarf.* The *firſt* makes it bigger and earlier, but not better. *Orange Bergamot.*

The *Katherine* is an old *Engliſh* Pear, undeſervedly neglected of late Years, but it is not only moſt beautiful to behold, but grateful to the Taſte, having a very high uncommon Flavour pleaſing to moſt, tho' diſpleaſing to ſome. It is in greateſt perfection on a Dwarf. *Katherine*

Ambroſca is a very beautiful good ſized Pear, inferior to none of this Month; for if it is eaten before it is too ripe, it hath a rich Taſte. Its only Fault is, that it often forgets its Benefactor. *Ambroſca*

Petit Ruſſelet is another excellent Pear of this Month; of a greeniſh yellow on one ſide, and red on the other. It hath a ſhort and ſweet Pulp and not diſagreeably perfumed. Is beſt on a Dwarf. *Petit Ruſſelet.*

Muſk-Summer Bon Chrêtien is the *firſt* of that Name that appears, and is valued chiefly for its high Perfume, pleaſing to Some, and the Averſion of Others. *Muſk Bon Chretien.*

Pears which ripen in September *are,*

The *Summer bon Chrêtien* of great Antiquity, well anſwering the Name of a good Chriſtian, *Sound at Heart to the laſt,* its *Heart* or *Core* being obſerved to continue uncorrupted even when the Pulp is decayed. This is a true *Bonum magnum,* having a noble, ſhort, high and juicy Taſte; and on a good aſpected Wall, will ſometimes be ſo large as to weigh fiveteen or ſixteen Ounces. It is a great Pity 'tis not always a good Bearer. But I venture to ſay a great part of its Barrenneſs is owing to miſmanagement. For it is commonly placed amongſt the reſt of the Wall-Fruit, where it hath neither Elbow room, nor Height to extend its ſlender and bearing Branches: whereas (as I have formerly obſerved) this Tree frequently bears even at the Extremity of the laſt Years Shoot, and therefore it ſhould have room both Side-ways and Upwards; and then I have *Summer Bon Chrêtien.*

found it to bear well enough, if the Knife has not been too buſy in *ſhortning*, but employ'd only to cut out the great Wood.

Verte-longue.
The *Verte-longue* diſcovers its Shape and Colour by its Name. It hath a wonderful ſoft and melting Pulp, and an exceeding thin Skin. Bears very well on an Eaſt or Weſt-Wall, and acquires a very high vinous Taſte, if the Soil be not too moiſt.

Dean Pear.
The *Dean Pear* on the Account of its Shape and Bigneſs is often miſtaken for the *Summer-bon Chrêtien:* But although it hath a melting Pulp and musky Juice, yet it wants the other's high Flavour. It ſhould not therefore be ſuffered to be too ripe; for then it is apt to grow mealy and inſipid.

Autumn Bergamot.
The *Autumn Bergamot* is ſo well known, that it hardly needs any Words or Deſcription to recommend it, for if it may not be ſaid to exceed all other Pears; yet at leaſt it muſt be ſaid, there are none yet known to *exceed* it. But as it will not laſt long, we are glad to find a Succeſſion of other good ones to imitate it. Its excellent Quality is, that 'tis better taſted from a Dwarf or Standard than from a Wall. In a wet Soil and cold Situation it will not proſper, and ſo it is ſometimes ſet againſt a South-Wall; which indeed makes it *bigger*, but takes off much from its true Flavour and inclines it to be inſipid.

Buree du Roi.
Buree du Roi is another incomparable Pear the latter End of this Month. It is large and beautiful and a never-failing Bearer; but it ought to have a Wall of a good Aſpect, and not thruſt againſt the North, as is the too common Practice; for though it will *bear* ſo placed, yet the Fruit is inſipid and watry. Whereas uſed with Care and Civility, it is a Fruit of a noble Size, delicious melting Pulp, and vinous Juice, and therefore claims equal Merit with the very *beſt*. It thrives well in a loamy Soil or mixt Clay; but in a light Sand without ſome agreeable Mixtures, it will not be perſuaded to grow to any bigneſs.

Pears ripe in October.

The laſt three or four mentioned Pears continue a good Part of this Month alſo; when there are ſome others preſent themſelves. As,

Monſieur John.
The *Monſieur John*, both the *Golden* and the *Grey* are good Pears againſt Eaſt or Weſt-Walls: The firſt is an old Pear, and hath a fine ſugared Juice, and the other hath ſomething a firmer Pulp, and will keep a little longer.

Creſſane.
The *Creſſane* is a fine large round Pear, and deſerves a good aſpected Wall. It is ſpeckled almoſt all over with red Spots. Its Skin is rough, but its Pulp extremely tender and full of Juice, attended with an agreeable Sharpneſs. It is firſt *grey*, but turns *yellow* as it ripens.

Swan's Egg.
The *Swan's Egg*, conſidered in all its good Qualities, is one of the beſt Pears, and ought much to be encouraged. It bears well, either on Standards or Dwarfs. But many who are lovers of this Fruit are apt to ſpoil it with Kindneſs, when they plant it againſt a South-Wall; where like many others it grows indeed larger, but is made thereby mealy and inſipid. On a Dwarf or rather Half-Dwarf, it arrives to great Perfection moſt Years, and ſeldom fails of a full Crop. It hath a moſt agreeable melting Juice, with a high vinous Taſte; and which is a conſiderable Part of its good Character, having a thick Skin, it will

ſometimes keep in Perfection (after it is ripe) near two Months; for I have my ſelf eaten them very good at *Chriſtmas*.

Marchioneſs. The *Marchioneſs* is large and ſhap'd like the Winter *Bon Crétien*: 'Tis ruſſet when gathered, but it grows yellow as it ripens. Is very melting, and of a ſweet musky Juice; ſo that it claims a Place amongſt the beſt Pears, deſerving an Eaſt or Weſt Wall.

Callic-Roſat. *Callio-Roſät* is much admired by many. Is of the Colour, Shape, and Bigneſs of the *Monſieur John*. Hath a very ſhort Stalk, and is ſet hollow like an Apple; will do well on Eaſt or Weſt Walls, or on Dwarfs.

The *Lanſac*, the *Beſi de la mot*, the *Green ſugar Pear*, the *Beſideri*, and the *Swiſs Bergamot* are all in Seaſon this Month.

Pears ripe in November.

Virgulee. The *Virgulee* is an old Pear and much eſteemed, having a very melting Juice. It is green when gathered about *Michaelmas*, but it grows yellow as it ripens. There is a particular Misfortune attends this Pear; for it is apt to taſte of whatſoever it is laid upon, eſpecially in a cloſe Place, for which Reaſon it bears Carriage not well. Oaken Shelves to lay them on to ripen in the Houſe, are beſt. It deſerves a South-Eaſt or South-Weſt Wall.

St. Germain. The *St. Germain* is another admirable Pear; greeniſh and ſpotted when taken from the Tree, but grows yellow as it ripens. It is full of Juice of a Lemoniſh Tartneſs very pleaſing to moſt. The Tree is a good Bearer on a Soil that is not too light and dry: But it deſerves the beſt aſpected Wall. It will keep good till the latter End of *December*.

Winter-Thorn. *Epinè d' Hyver*, or *Winter-Thorn*, is a handſome pyramidical Pear, *green* upon the Tree, but *yellow* when ripe, with a ſattin Skin. Its Juice is greatly perfumed, and very melting, if it have the Advantage of a good Wall.

Spaniſh Bon-Crétien. The *Spaniſh Bon-Crétien* is a very good Pear on a South-Wall, and it is thought to deſerve that Advantage for its handſome Bulk, ſhort Pulp and ſugar'd Juice; to ſay nothing, that it anſwers its Name and Character.

Lewis-bon. The *Lewis-bon* is ſhaped much like the St. *Jermin* Pear, hath a ſmooth Skin greeniſh and ſpeckled, and a Juice very rich and ſweet, eſpecially on a dry Soil. It ſhould have the Advantage of a Wall, for its Fruit is apt to fall off.

Pears ripe in December, January *and* February.

Beſides that moſt of the Pears before mentioned for *November* will alſo keep and be very good for the whole Month of *December* or longer, there are alſo ſome of the very beſt Pears yet to come, that preſent themſelves to the Taſte of the Curious with no ſmall Merit. As,

La Cheſſery. The *La Chaſſery* is a middle ſized Pear of the Shape of an Egg, greeniſh, and ſometimes ſpeckled, having long Stalks; its Pulp is very melting, and its Juice ſugared and a little perfumed, ſo as to be agreeable. It loves a dry Soil, and expects a good South-Wall to free it from being watry.

Ambret. The *Ambret* hath many of the Properties of the *la Cheſſery*, and is much of the ſame Shape and Bigneſs, but more inclining to be grey and ſpeckled, and is ſomething longer before it bears. It is eſteemed an excellent Fruit, melting and ſugar'd, and deſerving of a good Wall.

Colmar. The *Colmar* now preſents it ſelf to us almoſt Faultleſs and in Perfection. For though it is one of the laſt good Pears, and continues when moſt others are gone, even in the coldeſt Seaſons of Winter, yet there is (as it were) a *Recapitulation* of all the good Qualities of other Pears centered in this. It is ſhaped much like the *W. Bon-Crêtien*, and is often miſtaken for it: But it is quite *another* Pear. It hath a large Crown ſunk very hollow; is greeniſh from the Tree; but hath ſome Bluſhes of red and yellow when it comes to be ripe. It is a large Pear, of a tender Pulp with a very ſweet and ſugared Juice: And the Tree makes a very handſome Figure when it is laden with Fruit; but that muſt not be expected till after five or ſix Years planting. It is ripe when it yields to the Thumb, and not before. By what I have ſaid it will eaſily be perceived, that it deſerves a good warm Soil, and a warm ſouthern Expoſition.

W. Bon-Cretien. The *W. Bon-Cretien.* This is a Pear of great Antiquity, and hath obtained a Credit and Reputation anſwerable to its Name. Some are apt to think there are ſeveral ſorts of them; but they are all one and the ſame Fruit; only the Difference of Soils, Expoſitions, Seaſons of the Years, and Condition of the Tree may make great Alterations both in Shape and Goodneſs. In perfection it is a fine Fruit, and oft weighs more than a Pound. But it may hardly be ſaid to be agreeable to our Climate, even ſet againſt the beſt walls; and for want of Sun generally proves watry and inſipid. They are beſt grafted on a Quince-ſtock, and ſet againſt the South Wall, where they may have Liberty to run. They are excellent indeed to bake: But it is generally thought a South-Wall may be better employed than to produce *baking Pears.*

The following Pears are not to be deſpiſed, but are admitted into the beſt Gardens: viz. *St. Andrew*, *Martin Sec*, *Petit Orin*, and the *Carmelite*; but they all require a South-Wall.

The *baking Pears* moſt in Repute, and which will do well either on half Dwarfs, North-Eaſt or North-Weſt Walls, are the *Cadiliac*, the *Pound Pear*, the *black Pear of Worceſter*, the *Engliſh Warden*, *Parkinſons Warden*, and a Pear called the *Lord Mayor's Shew*, whoſe Fruit is ſtrip'd with yellow and green, and is a free Bearer.

N. B. Moſt Pears are known by their Leaves.

CHAP.

CHAP. XXI.

A Catalogue of the beſt Apples.

OF this ſort of Fruit likewiſe there is almoſt infinite Variety, every County in *England* having its peculiar Favourite. However that a Lover of Planting may not be under too great Perplexity in his Choice of the beſt ſorts, I will here ſet down a Catalogue of ſuch as are unqueſtionably good, not excluſive of many others that may be called ſo too.

The *Genneting.* A *Præcoce.*
The *Summer Queening.*
The *Golden Pippin.*
The *Golden Renating.*
The *Golden* or *Aromatic Ruſſet.*
The *Golden Munday* or *Pear-Ruſſet.*
The *Queen's Pearmain.*
The *Summer Pearmain.*
The *Winter Pearmain.*
The *Kentiſh Codlin.*
The *Kentiſh Pippin.*
The *Kirton Pippin.*
The *Stone Pippin.*
The *Non-pareil*, the very beſt for all Uſes, whether the Table or Kitchin, or for Cyder, and bears moſt plentifully, beſt when grafted on a Quince or Crab.
The *Holland Pippin.*
The *Paradiſe Apple.*
The *John Apple* or *Deux Ans.*
The *Margil.*
The *Bell voir Pippin.*

Vines uſually planted in *England*, and will ripen with us are,

The *July Grape*, a *Præcoce*, and therefore not very good.
The *White ſweet Water.*
The *Black Cluſter.*
The *White Muſcadine.*
The *Blue* and } *Frontiniacs.*
The *Grizley* }
The *White Frontiniac*, though an excellent Grape, ſeldom ripens in *England.*

CHAP. XXII.

Of the Gooſeberry, Currant, Philbud, Raſberry, and Strawberry.

BEfore I mention the ſeveral ſorts of Gooſeberries and their Uſes, it may not be amiſs to direct the beſt Method of propagating and encreaſing *them* as well as Currants: And this is the more neceſſary to be done, becauſe all the Authors that have hitherto treated on this Subject, have (at leaſt as far as I can find) plainly miſs'd it, or elſe have led the Planter into the common Miſchief and Inconvenience attending this uſeful Shrub.

The three uſual Ways of propagating the Gooſeberry and Currant, are either by *ſowing their Seeds*; but here as in almoſt all other Caſes Nature is apt to degenerate, and you can never be ſure of the ſort you would have this way. Or elſe by *Cuttings*; or laſtly by *Off-Sets* or *Suckers.* By the two laſt Ways the End is effectually attained; but then in the common Method of Practice, the Trees are peſtered afterwards with ſuch numerous *Suckers*, that without great Care, and continual Amputation, they will never be kept uniform upon one Stem; whereby alſo they are weakened and hindered in performing their proper Office.

To cure then this Inconvenience, I have by Experience found, that if from a Cutting or Off-ſet of a Gooſeberry or Currant, you take off with a ſharp Knife all the ſwelling Buds, as far as you intend it to be thruſt into the Earth, or to be covered, the Tree will never afterwards put forth *Suckers*, but ſtand regularly upon one Stem, and form (as it ſhould) a round Head, which is always obſerved to afford the largeſt and beſt Fruit.

The Reaſon of taking off the Buds is founded on this Obſervation; That from thoſe Buds Nature forms the *Suckers* or *Off-ſets*, and not the *Root* as is generally thought. For the Root is formed in the ſmooth Places between the Bark and the Wood, as is plainly ſeen in thoſe Cuttings which are deprived of their Buds, which take root very readily, though they do not put forth Suckers.

This Obſervation is of great Uſe alſo to thoſe who make uſe of Suckers as a Foundation for ſtone and kernel Fruit, as in the Caſe of Plums and Pears, whereon are inoculated Peaches, Aprecots, and the beſt Pears: For if prudent Care be taken to *diſ-eye* the Suckers, as far as they are covered in the Ground, (though I have not had experimental Proof of *this*, yet) by Analogy of Reaſon, this ſhould be an effectual Remedy to prevent a multitude of Suckers ſo troubleſome in Borders, and injurious to the Fruit-trees: The Cuttings of Codlins ſhould alſo be thus managed.

Gooſeberry. The following Kinds of *Gooſeberries* are chiefly worth our Notice, and ſhould be encouraged, *viz.* The *white Dutch*, excellent for eating. The *large Amber*, beſt for baking when green. The *Wallnut Gooſeberry*, remarkable for its largeneſs, and is firſt ready for Tarts. The *red* or *black*, *hairy* or *bearded Gooſeberry* is a very pleaſant and much valued Fruit, both for eating raw or baked, and preſerving. It would be endleſs to mention all the ſeveral Sorts which are raiſed every Day from Seeds: But it may not be amiſs to ſay there is a *Champaign Gooſeberry*, a *Præcope*, no otherwiſe valued, but that it comes ten Days ſooner than the reſt.

Currant. The three remarkable ſorts of *Currants* very different from each other are the *large white Dutch Currant*, which is an admirable Bearer; and if ſet againſt a Wall in the intermediate Spaces between young Fruit-trees, will produce Fruit ſometimes as big as Grapes, and not much leſs pleaſant. The common *red Currant* is a good Bearer, and will hold its Fruit till *Michaelmas* if preſerved with Mats from Birds. And the *black Currant*; the Flavour of which, though it is diſpleaſing to moſt, yet for Variety's ſake, and ſome medicinal Uſes ſhould not be wanting. The phyſical Taſte is much loſt, when uſed either in Tarts, or put into Brandy inſtead of black Cherries.

Both the *Gooſeberry* and the *Currant* ſhould be kept upon one Stem, with a roundiſh Head a little open in the middle; ſtill obſerving to take away every Year ſome of the *oldeſt Wood*, as alſo all the *large white Wood* of the laſt Years Growth: For it is the Wood of two or three Years old, and the *ſmall white Wood* from them, that bears the beſt and largeſt Fruit.

Philbud. The *Philbud* is an improved kind of Hazel, and bears a Fruit much admired by moſt, eſpecially as an Amuſement over a Glaſs of Wine after a good Dinner. The *Scarlet* ſort is moſt valued, and is reckoned to have the thinneſt Shell and the higheſt Flavour. You are never ſure of a good Sort from the Seed; therefore they are generally raiſed from *Suckers* or *Off-ſets*; which (to prevent their unreaſonable multiplying at the Root) ſhould be uſed as the Gooſeberry in the Method of their Propagation.

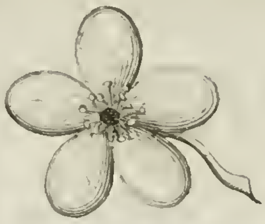
Raſberry. The *Raſberry* is a Fruit of a prevailing uncommon Flavour, pleaſant and acceptable to moſt. They grow wild in the Woods about *Durham* in great abundance. I could never diſcover more than two Sorts of them, the *White* and the *Red.* The firſt wants I think ſomething of the true *Flavour* of the laſt, and therefore is not ſo much eſteemed or encouraged. They will proſper almoſt in any Soil, but love the Shade; where tho' the Fruit will not be ſo *early*; yet there it is *largeſt* and *beſt.* They are propagated, either in *Autumn* or *Spring*, from Off-ſetts of the laſt Year, pruned to about a Foot and half. Little or no Fruit can be expected the firſt Summer, not a great deal the ſecond, but the third Year will produce a full Crop from the Shoots of the *preceding* Year. Moſt Authors have directed the keeping them clean from Weeds: But as this is a Plant which loves *Coolneſs* and *Moiſture*, I have found that the leſſer Weeds are rather an Help than a Hindrance; and therefore they may be left to themſelves after they are pruned to three Foot high in *March*, provided they be kept clear only from Docks, Nettles, &c. all the dead Stalks being removed in the Spring.

Strawberry. The *Strawberry* next juſtly challengeth our Obſervation and Regard. Of which we have chiefly *four* Sorts, all of them much coveted and eagerly ſought after, as they preſent themſelves at ſuch an early ſeaſon of the Year, when Novelty excites an impatient longing Appetite after Fruit in general, hitherto ſo long deny'd, and in vain expected.

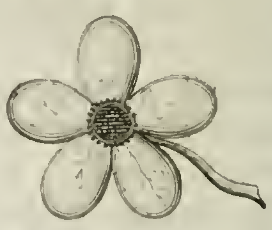
The firſt and moſt early ripe is the *Virginia* or *Scarlet-Strawberry*, which if it have the Benefit of a good Expoſure and a light Soil, will be ripe the middle of *May.* However Strawberries of all Sorts naturally delight in an heavier Soil inclining to Clay; which if it be help'd with a Shower of Pidgeon dung in the Spring, will produce a wonderful Crop, and very large Fruit.

The *Hautboy* or *great White Strawberry* is an admirable Bearer in a proper loamy Soll or mixt Clay; hath a very agreeable Flavour, and ſometimes arrives to the Bigneſs of a ſmall Wallnut. This Plant is not ſo well underſtood as it ought; otherwiſe it would be more propagated than it is: But the *Soil* and the *Sort* hath diſcouraged many. The *firſt* if it be too light may be eaſily mended with Clay or Marle. But the *other* wants to be explained; for I have never yet ſeen that Author who makes the proper Diſtinction betwixt the *true* and the *baſtard* Kind. The *true* Sort is never to be known and diſtingniſhed from the other, but at the Time of bloſſoming; when it may be obſerved, that the little Fibres that proceed from the middle of the Flower are *ſhort*, lying cloſe and ſnug to the white Petals or Leaves: Whereas the other *baſtard* Kind hath its Fibres *ſtaring* and *ſtarting* out much *longer*. This Kind never bearing any Fruit, ſhould always, as ſoon as diſcovered, be rooted up immediately, that the *true one* may be put in his Place. In many places I have obſerved more than half of this *baſtard Sort* to get Place in a Strawberry-bed, and the Maſters never underſtood the Reaſon of their Diſappointment till I explained it, and gave them better Hopes. However to make this Difference better underſtood, and the *Truth* appear, I have annext the Figure of both as nearly as can well be expreſſed.

The Baſtard Sort



The true Sort



The third Sort is the *little Wood Strawberry*, which is alſo of two Kinds, the *red* and the *yellow*; both equally good and conſtant Bearers, and make an agreeable mixture at the *Deſert*. The Slips of the *firſt* degenerate, and therefore ſhould be fetch'd from the Woods, and planted anew once in three or four Years: But every Year freſh Earth or Pidgeon Dung ought to be thrown amongſt them in the Spring, which will help to refreſh and cover their Roots, which are apt to be thrown out of the ground by the Froſts. And at Midſummer, if the Fruit is deſired to be large and fair, the Runners ſhould be carefully taken off, ſo as to leave all the Plants *ſingle*.

The *Wood Strawberry* will ſometimes bear twice a Year, in *June* and in *October*, if the Seaſon be favourable and warm Rains come: But the moſt certain way to make them bear in *Autumn* is to cut down the Leaves and Flower-Stems, juſt before the Bloſſoms open in *May*, and they will Shoot out afreſh and bear ripe Fruit in *October*. If ſome of the ſtrongeſt Roots be ſet in Pots and put on a gentle hot Bed in *January*, they may with Care be ſo ordered as to produce Fruit in *March*: But Fruit in all theſe artificial ways is always *flat* and *inſipid*.

Berberry. The *Berberry* is a Plant that ſhould not be neglected or forgotten; for it is a pleaſant Shrub, bearing beautiful Branches of yellow Flowers in the Spring, and no leſs pretty Cluſters of red Berries towards the *Autumn*. The Fruit has an agreeable Acidity when it is ripe, tho' it is ſeldom uſed any other way but in Sauces. We are told of a Sort without Stones, which becauſe I have never ſeen, I cannot recommend; but ſuch muſt be more valuable in Sauces. They are propagated by Cuttings and Suckers, and therefore to prevent their ſpreading ſo much at the Root, they ſhould be ſerved like the Suckers of Gooſeberries; as is before directed.

Having thus gone through all the Particulars and Articles of Fruit uſually planted in a Fruit-Garden, directing at the ſame time their management and manner of Cultivation, ſhewing their Natures, Properties and Uſe; I ſhall now proceed to ſay ſomething of the ſeveral Diſeaſes Fruit-Trees are ſubject to, pointing out at the ſame time, the moſt probable Cures and Remedies for them. To which I ſhall add afterwards a Chapter of Blights, and the moſt probable Occaſions of them, that thereby we may be help'd to look out for a Remedy and Defence.

CHAP.

CHAP. XXIII.

Of the Diſeaſes of Fruit-Trees.

FRuit-Trees are ſubject to many *Infirmities*, which weaken and deſtroy them; ſo that we may properly ſay they are liable to Diſeaſes and Diſtempers like other Animals. Yellow Leaves out of ſeaſon, or bliſtered with red Spots, new Shoots growing black or dying on their Extremities in Autumn, Fruits remaining ſmall or dropping off unſeaſonably, are ſo many ſymptoms of Weakneſs and Decay, either in the Head, Stem or Root.

I have been tempted to think further, from ſome Obſervations I have made, that there are ſome certain Diſeaſes in Trees ſomething analogous to thoſe in Human bodies. Among which there are ſome that may be cured with the Aſſiſtance of Remedies, and others which hitherto appear incurable, ſince what ever can be done to them hath ſtill proved ineffectual.

I have had Pear-Trees directly in the *Meaſles*, the Leaves of the whole Tree being all over ſpotted with red; which Spots in the Autumn became bliſtered, hollow, and full of ſmall Holes, which I ſuppoſe to be the Paſſage for Inſects to go and lay their Eggs, of which I could diſcover innumerable Quantities by the Help of my Microſcope. It is very hard to ſay what ſhould be the Cauſe of this Diſeaſe; but I have obſerved it more than once in ſeveral Gardens beſides my own: And it is remarkable too, that tho' the Tree continued in a ſtate of Vigour, yet the Leaves and ſometimes the ſmall Twigs became every Year more and more meazled and bliſtered, till it became a frightful Sight: The Fruit fell off before it was half ripe, and *that* put me upon a Reſolution to cut off the Head of the Tree to form new Wood; but I quickly found the Diſeaſe continued, and in that State I left it at *Telvertoft*.

I am apt to think the Foundation of this Diſeaſe was in the Root, for I ſaw nothing of it, till the Pear-tree Roots might be ſuppoſed to reach an ill-natured untractable Clay, which lay within a Foot of the Surface. There may be alſo ſomething in Mr. *Bradley*'s Conjecture, that the Bliſters were occaſioned by the Hailſtorm bruiſing the Leaves and giving occaſion thereby for ſuch Inſects as floated and circulated with the Juices in the Veſſels of the Tree to lodge there as a Neſt for Eggs. For (as he further rightly obſerves) " All Inſects, as they are of different " Kinds, have reſpectively proper Places where they lay their Eggs to " be enlivened; and thoſe places I always obſerve are actually in a ſtate " of *Putrefaction:* So that it ſeems as if the putrid Juices of Bodies, " either Animal or Vegetable, were eſſential to give Life to the Eggs of " Inſects, and nouriſh their Young.

" I believe (ſaith he further) it will not be difficult to conceive how " the Eggs of ſome ſmall Inſects may paſs thro' the Veſſels of Plants, " when we conſider their exceedig ſmallneſs: For many Kinds which I " have examined with Microſcopes do not ſingly fill more Space than one

" tenth part of the Orifice of a *Wood-veſſel*, ſo that they might paſs in " Crowds thro' ſuch Pipes without Interruption. And the Pores and " Veſſels of the *Roots* are ſtill larger than thoſe in the Trunk, and as " capable of receiving them as they are of taking in their proper Nou" riſhment from the Earth. I am of Opinion that moſt Kinds of Plants " have continually the Eggs of ſome ſort of Inſect or other circulating " with their Sap, which cannot be enlivened as long as the Plants are " in Health, and the Sap full of Spirits; but only when they meet " with ſome wounded or decay'd Part, where the Juices begin to cor" rupt."

But whatever Accident might be the Occaſion of this Diſtemper, the Remedy (as far as I can find) it ſtill a Secret. And I am apt to think there can be no Cure, except the Foundation be removed, *i. e.* to plant another Tree and in a better Soil. For I try'd Mr. *Bradley*'s Conjecture, and made uſe of Quickſilver ſeveral ways, both by *boring* in the Stem, and by *Plaiſtering* ſome of the main Branches, firſt peeling off the outward Rind: But (as I take it) there not being Heat enough in the Sap of a Tree to ſet the Mercury in Motion, as there is in the Blood of an Animal, the Mercury had no manner of Effect, and made no ſort of Alteration.

Another Diſeaſe I have obſerved ſome Fruit-trees to be ſubject to is, *The Dead Palſey*; as when the Circulation of the Sap is of a ſudden ſtopt by Blaſt, or Canker, or other Accident, one *Side* or *Part* of a Tree preſently languiſhes and dies, and ſometimes the *whole*, when it ſeizes the Stem or Part where it was inoculated. There is no Remedy for this, but only to cut out the *affected* Part, and to recover if poſſible, the Beauty of the Tree from the Part *unaffected*.

Again, *Gum*, or a continual Running of viſcous Matter from ſome one Part of a Tree, eſpecially a Peach, is another incurable Diſtemper. When it appears only on a Branch there is hopes, cutting only that Branch two or three Inches below the Part ſo diſtempered; by that means the *Gangreen* may be hindered from extending further. If it diſcover itſelf about the Bud or Graft, or all over the Stem, the beſt way is to loſe no more Time about it, but to provide another for its Place. Too great Richneſs of the Soil, or dunging the Borders, is often the Occaſion of this Diſtemper.

Many Fruit-trees are obſerved to labour under a gradual Decay or *Conſumption*, without any viſible Tokens or Reaſons of their Weakneſs. This is ſometimes occaſioned by bad, withered, wounded Roots at firſt Planting; and if ſo it commonly ends in Death. But if it be occaſioned by Inſects ſeizing and gnawing the Roots within the Ground, ſuch as Cock Chafers and Worms which afterwards prove Breezes or Gad-flies; in ſuch Caſe it is proper to ſearch narrowly the Roots of the Tree in order to remove and deſtroy them; putting in at the ſame as much freſh *untried* Earth as is poſſible: And this will give new life and vigour to the Tree. A multitude of Piſs-Ants are likewiſe often the Occaſion of languiſhing *Conſumption* in Fruit-trees, by eating away all the Fibres and even all the outward Coat of the larger Roots. *Theſe* after they are well and frequently diſturbed by digging about the Roots, and tempted to get together in Bodies, by raw Fleſh or dew Worms cut in pieces ſtrew'd about the Borders, may be eaſily deſtroyed by ſcalding Water, diſcretely ordered, ſo as not to injure the Trees.

Another Diſtemper which moſt Fruit-trees are ſubject to, is the *Yellow-Jaundice:* But this, being almoſt wholly owing to a wet Soil, and an indiſcreet planting them too low, if the Diſeaſe hath not continued too long, is capable of a Remedy. To be buried alive is the worſt Way of loſing Life. The Practice is too frequent in Vegetables, and is diſcovered to be a Misfortune, when the Leaves and ſometimes the ſmaller Branches turn *Yellow*, long before the Seaſon. If the Diſtemper is not remedied in time, it may be too late for a Cure, and Death will follow. But if after three or four Years planting, a diligent Care be uſed to raiſe the Tree conſiderably, all may be ſet to Rights. This may be done by firſt removing a good Part of the Earth from about the Root, and then by the Help of two Men with Spades oppoſite to each other, the Tree may be gently and gradually raiſed to its proper Height, even till ſome of the bigger Roots appear two or three Inches above Ground; and then, having ſome untried Earth ready at hand, let a third Perſon carefully thruſt as much of it as poſſible (whilſt the Spades remain in the Way of Leavers) into all the Vacuities with the Hand, that the Tree may not *ſink* again. By which Method it will quickly be ſeen what was its Diſtemper and the Occaſion of it, even by the following Verdure of the Leaves and the thriving of the Tree!

The *Canker* is another Diſtemper, which moſt Kernel-Fruit are ſubject to; and ſome ſorts of Apples and Pears more than others. The chief Occaſion of it is, either a hungry Gravel, or Sand lying near the Surface, or a cold moiſt ſtubborn Clay; into either of which, when the Roots come to enter and find a Paſſage, many of the uppermoſt Branches will diſcover their *Diſlike* by a *cankerous* Humour, which ſometimes ſeizes them only half way, but moſt commonly quite round the *ſmall* Branches, ſo that they die immediately. Nay this Diſtemper many times ſeizes the very Stem and Body of the Tree; whereby it becomes wounded, mangled, and defaced. But yet ſo long as the Canker doth not *quite* ſurround any one Part of the Stem of an Apple-tree, and leaves but a narrow Path for the Aſcenſion of the Sap, it is remarkable that ſuch a Tree is moſt prolific; and ſo long as it continues, though in its weak State, and with a *broken* Conſtitution, never fails to bear a good and plentiful Crop; agreeably to the Maxim I have all along laid down, *That every convenient Check of the Sap in its free Circulation, which way ſoever performed, though it ſtops and hinders the luxuriant Growth of Wood, yet always tends to the Production of Fruit, and more or leſs diſpoſes every Fruit-tree to bear.*

Where this Diſtemper attacks the Stem or Branches of the Tree quite round, all *above* the Sore muſt neceſſarily die: But when it affects it only in Part (as commonly it doth) in ſuch a Caſe a Stop may be put to it, by cutting to the Quick as far as the Canker reaches, and applying Cow-dung tempered with Clay to the Wound, tying it round with Baſs-mat or woollen Yarn: By this Means the Sore will ſoon skin over and recover: But the beſt way in future Planting is to remove (if poſſible) the *Cauſe:* That is to ſay, take away the Gravel, Sand, or Clay, and fill up the Place (not with Dung but) with a mixt Soil or *untry'd Earth*; and plant *high*, even on the *Top* of the Surface.

Another Diſtemper ſtill which ſome of the beſt and tendereſt Pears are ſubject to, is a *Louſineſs* all over the Branches in their outward Coat or Bark. The whole Bark will look like ſo much Net-work, diverſified and

and broken into innumerable Figures, in the Chops and Craks whereof are lodged infinite Numbers of little Animals inviſible to the naked Eye. And I have this Reaſon to believe theſe Animals paſs and repaſs in a continual Circulation, even in the Sap-Veſſels; becauſe the Fruit it ſelf I have more than once obſerved to be gradually covered, as it increaſed in Bigneſs, with this ſort of Net-work, ſomething like that of the Melon, only full of Eggs and Animals. The Tree will live and bear Fruit ſeveral Years after it is thus attack'd: But it will gradually decline in its Vigour, and the Fruit will at length become ſmall and inſipid. The Evil is in the Root and the Soil; and therefore to remove the greateſt part of *both* might be a very probable Remedy, and ſhould be attempted where the Fruit is much valued and ſet by; otherwiſe I ſhould think the beſt way is to loſe no more Time, but provide another for his Place.

Theſe are the chief of what may properly be called *Diſeaſes of Trees:* As for *Diſaſters* and Accidents attending them, thoſe will be more properly conſidered in the next Chapter, where I ſhall attempt an Explanation of *Blights*, and endeavour to enforce their Remedies.

CHAP. XXIV.

Of Blights.

MOST Fruit-trees are ſubject one way or other to be attack'd, either in their Leaves, Bloſſoms, or tender Branches by many outward Accidents; and the unkind Seaſons, which we, who live in an Iſland too often experience, frequently ſubject them, (even when they are leaſt able to bear it, in the Spring) to the Injuries of *Froſts* and *Blaſts*; whereby the Bloſſoms and tender Fruit are *ſhrivelled*, *mortified*, and *blighted*; and ſometimes the very Tree it ſelf will diſcover ſome melancholy Signs of a Chaſtiſement from above, ſo as immediately to ſhrink, wither, and die.

Theſe Things are the real Grief of the diligent Gardener, when he ſees all the Fruit of his Labour and Care *blaſted* at once, and his forward Expectations brought to nothing even in one Night, from the Infelicity of *cold Dews*, *black Winds*, *Storms of Snow and Hail* ſucceeded by *Froſts*; ravaging, and as it were *ſcorching* every thing tender that ſtands in their way unguarded.

It is obſervable that they who live on the Continent (even in the ſame Degrees of Latitude) do not feel theſe Severities in the Spring as we do, having a more equal regular Warmth from the Sun and more certain Seaſons: Tho' it is more than probable, that many of the Diſaſters we feel from *Blights*, are brought to us in the Eggs of Inſects floating in the Air by Eaſterly Winds, ſo frequent in the Spring; as the ingenious Mr. *Bradley* hath with a good Shew of Reaſon conjectured. However (as a *Salomen Miſeris*) they who live on the Continent are not without their Complaints neither. They are ſubject (eſpecially in the moſt Southern Parts) to violent and ſudden Hurricanes, frequent Thunder and Lightning, attended with ſuch exceſſive *Weights* of Rain and Hail burſting out of the Clouds, that they ſometimes ſee with Grief enough every thing round about them deſtroyed at once. And yet, before either of us complain too much, we ſhould look *inwards* as well as *upwards*, and conſider well whether we deſerve a better World than this, and for what End we came hither. In the mean time our loving God hath given us Reaſon and Foreſight, whereby not only to cure the *inward* Diſeaſes of our Bodies, and alleviate their Malignity by preventing Remedies; but alſo to guard againſt *outward* Misfortunes of all ſorts, and even thoſe which ſo ſenſibly affect our tendereſt Fruits and Plantations, proceeding from the evil Influence of a malignant Air.

In one of my former ſmall Treatiſes on this Subject I have, I think, *plainly*, though *briefly* hinted at the Nature of *Blights*, and the ordinary Methods whereby Fruit-trees are found to be attacked, in order to attempt a Remedy; and I am ſo well ſatisfied, that I have rightly touched both the Diſeaſe and the Remedy, that I ſhall only here further open and explain *both*, as further Experience and Obſervation ſhall naturally lead me to do.

In all *low* and conſequently the *beſt* Situation for a Fruit-garden, I have obſerved, that all or moſt of the worſt Froſts and Blights both in Spring and Autumn fall *perpendicularly*, *i. e.* as perpendicularly as the Motion of the Air will ſuffer them: For the condenſed Vapours falling from the upper Region do there commonly form themſelves at Night toward the Surface of the Earth in a ſort of Dew or Miſt, conſiſting of watry Drops more or leſs condenſed. And becauſe every thing *moiſt* or *wet* is moſt ſubject to be affected by the Coldneſs of the Air; therefore the more any thing lieth upon, and expoſed to this perpendicular Deſcent of Vapours, the more will it be ſubject to be *frozen*, or (which is the ſame thing if it be tender) *blighted*.

Both Reaſon and Experience confirm this Truth to us: As in the Caſe of a Fruit-tree planted againſt a ſlope Wall for the Advantage of receiving more of the Sun's Rays; this we always find to be firſt and moſt ſubject to be *blaſted* both in Spring and Autumn. And again: I have frequently obſerved the Leaves and tender Shoots of a tall Aſh-tree in *May* to be frozen, and as it were *ſinged* in all the bottom and middle Parts, whilſt the upper part of the Tree, that was exalted above the Influence of theſe blaſting Miſts were left free and untouched; both which Inſtances ſhew, that the loweſt and beſt Situations, though naturally defended from the Violence of Winds, yet are ſubject to theſe Blights proceeding from hovering Dews, or Vapours frozen in the Night.

To remedy this Misfortune I have propoſed the building Walls with *horizontal* Shelters at convenient Diſtances in Rows, with proper Gaps for leading on the Branches; and this effectually anſwers the Purpoſe as far as their Influence extends. But becauſe ſome Inconvenience hath been found through Miſtakes in placing theſe Shelters, I have ſince choſe rather to recommend *occaſional* Shelters of three or four Rows of Deal Boards, which are to be ſupported by ſquare Bits of Oak left *projecting* about ten or twelve Inches in the Structure of the Wall. The Boards need not be laid on, except during the two dangerous Months of *March* and *April*, and ſome Part of *May*: But it ſhould always be remembered, that the Boards be placed a little *dipping forward* that the Rain may be thrown off from the Wall and the Trees.

Some curious Perſons have a Contrivance of putting narrow Slips of Lead betwixt every two Rows of Brick, letting the Lead project during the time of Danger, and afterwards bending it back, whereon to reſt the Fruit to accelerate its ripening.

Others procure matted Straw on long narrow Hurdles about four or five Foot deep: And having already at convenient Diſtances faſtened and placed long Poles reaching from the top of the Wall to the outſide of the Border in a Slope; againſt theſe, by the Help of two Men, they lean the matted Hurdles, making the upper Edge reach the top of the Wall, and faſtening the bottom, leſt it ſlip down, with a *Scotch* in the Poles. And although the greateſt Part of the Wall at the bottom lie open; yet it is obſerved that this way effectually ſecures the ſetting off the Fruit; after which both Hurdles and Poles are entirely removed. This we are told was Mr. *Speaker Smith*'s Way at his Seat in *Hampſhire*, and was (he thought) *improving* the Method of *horizontal Shelters*.

Although this may be thought a very troubleſome Method, to ſet on and remove theſe Hurdles every Night and Morning; yet every *improving Thought* is to be encouraged; and I ſhall always acknowledge my ſelf obliged to ſuch ingenious Contrivers, as attempt probable Remedies for the Misfortunes of a bad and uncertain Climate. However this will be readily diſcerned and acknowledged, that which ſoever of the Ways before mentioned be choſen, they all centre and reſt in this true and undoubted Maxim long ſince laid down by my ſelf, that the chief Deſtruction of Fruit in the Spring, is owing either to cold Storms of Snow and Hail falling *perpendicularly* in the Day, or to the cold Vapours and Dews falling from the upper Region in the Night: Therefore the beſt Shelter and Guard againſt theſe, muſt rationally be ſuppoſed to be ſuch as are placed *horizontally*; and yet ſo as to loſe as little as poſſible of the Sun's Rays and Heat. But that I may avoid Repetitions, as much as poſſible, and yet give the Reader a clear and diſtinct Idea of this Matter, I will here inſert a Copy of a Letter I wrote to the Right Honourable the Earl of *Warrington*, who propoſed ſome Queries, and deſired my Advice in this Matter.

My Lord,

I Had the Honour of your Lordſhip's Letter, dated *January* 3. which came not to my Hands till a Week after. I take this firſt Opportunity therefore to give your Lordſhip my Thoughts of what you are pleaſed to propoſe relating to *horizontal Shelters*. I perceive that which gave the firſt Thought of making one projecting Shelter on the Top of the Wall to ſerve for all, was the Obſervation of an Yew-tree projecting over an *Aprecot*. And indeed the Effect and Conſequence of that Shelter was exactly agreeable both to Philoſophy and Experience. But then it is to be conſidered, that that being no Part of the Wall, but elevated ſomething above it, it robb'd none of the Wall of the Benefit of the Sun's Rays, and yet gave it all the Advantage of a Shelter by a conſiderable Projection: Whereas a Wall of only nine or ten foot high, if it ſhould have a coping to project twelve Inches, would not be above half ſheltered: And yet ſo much of that half as the Projection comes to, would be in a manner loſt by being deprived of the Sun's Rays. For though I ſay the chief Cauſe of our Blaſts is from cold perpendicular Dews in the Night; yet by that Expreſſion is meant only *Dews falling perpendicularly*, *i. e.* as perpendicularly as floating Vapours in the Air will be ſuffered to fall;

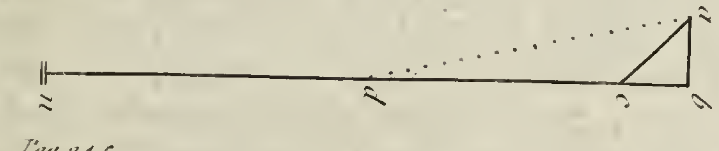
which yet are eaſily put out of an exact perpendicular Deſcent by the leaſt Breath or Motion of the Air. This is I think made very intelligible by the eaſy Figure below. To give therefore ſome real advantage to brick Walls already built I ſhould adviſe, either to plant Rows of Ever-Greens, ſuch as Yews, Firs, &c. on the North Side, ſuffering them to grow into a Hedge after they are got four or five Foot above the Wall, and then to be clipt in the Figure of a triangular *Priſme*; or to fix pretty frequently bits of Glaſs three or four Inches wide into the Joints of the Brick: Or laſtly, to fix half a dozen Rows of thin Lead of the ſame Breadth (with Notches in them for the Branches to paſs) which may be turned up and down as occaſion ſerves, either to give reflected heat, or to ſhelter the Bloſſoms in the Spring. If I ſhould be ſo happy as to give any uſeful Hints for the Improvement of vegetable Nature, or to have made any Obſervations that ſhall pleaſe ſuch ingenious Enquirers as your Lordſhip, it will add much to the Satisfaction I have all along had in theſe ſorts of pleaſure, and in the Retirement I enjoy. Your Lordſhip therefore may readily command any Aſſiſtance in the Power of him, who is tho' unknown,

Your Lordſhips

Yelvertoft,
Jan. 14. 171$\frac{8}{9}$.

most obedient humble Servant,

J. LAURENCE.



b n, is a Brick Wall ten Foot high.
a b, is an horizontal Shelter one Foot projecting.
a c, a Line repreſenting the Shadow of the Sun at a middle Altitude for the Six Summer Months.
a d, the Line of the cold Dew falling nearly perpendicular. Therefore,
b c, equal to one Foot, loſes moſt of the Advantage of the Sun.
c d, equal to four Foot, that part of the Wall which enjoys the Influence of the Sun and Shelter.
d n, equal to five Foot, that part of the Wall which loſes all the Advantage of the Shelter.

As to thoſe ſtrong black Winds, which come from the Eaſt or North-Eaſt, and are ſuppoſed to convey along with them the minute Eggs of deſtroying Inſects; *theſe*, as they commonly blow more *horizontally*, ſo their Influence cannot be ſuppoſed ſo immediately to reach or affect the beſt and tendereſt Fruit planted on the Southern Aſpects. Dwarfs, Standards, Eſpaliers, and the North or North-Eaſt Walls will indeed lie open and be expoſed to their Ravage and Fury, if they happen to blow in the Time of their full Bloom: But as thoſe *black Winds*, ſometimes attended with Froſt, do generally ceaſe blowing, before the Glory of the Dwarfs and Standards appears, their influence is the leſs hurtful.

But to prevent their Danger, the Practice of the common People in ſome Countries ſeems to be rightly founded, and ſhould be encouraged, *viz.* When theſe Winds blow ſo late as to raiſe their fears, they provide large heaps of *Weeds*, *Chaff*, or other combuſtible matter, on the Wind Side of their Orchards, and ſet them on Fire; that the Smoak may ſuffocate the Inſects or poiſon their Eggs, as they paſs along with the Air. By this means it hath been taken notice of by ſome curious Perſons, that large Orchards have been preſerved, whilſt the neighbouring Parts have ſuffered great Blights, and the Loſs of all their Fruit.

From all the Obſervations I have made, I gather, That the later theſe Eaſterly Winds blow, the more harm they do; and I am the more confirmed in the Opinion of their carrying and conveying the Eggs of Inſects along with them from the Continent, from an Obſervation I made (and I cannot but wonder it was made by no body elſe) of a general *Blight*, which the *Horſe-Bean* ſuffered in the Year 1719. throughout moſt Parts of *England*, of which I ſent an Account to Mr. *Bradley*: and he hath accordingly given a Figure both of the *Bean* and the *Inſect* which was bred in it in his *Phil. Works of Nature*, &c. But becauſe it is left there without any Obſervations upon it, I ſhall obſerve as followeth: That the little *Inſect* (as was thought it did by moſt to whom I firſt ſhew'd the Bean) *did not* make its way *into*, but *out of* the little Hole in the Side of the Bean. And I had a plain and viſible Demonſtration of this, by obſerving the gradual Progreſs the Inſect made with its Horns or Teeth, before the Hole was perforated. I laid by ſeveral Beans in my Window, that I could plainly perceive had Inſects in them, (for indeed there were few that Year without them) and though there was no Orifice when I laid them by; yet in two or three Days after, I plainly ſaw the Inſect ſtruggling to get out of the Hole itſelf had made, and in an Hour after it took Wing and flew away. This was in the Month of *October*; and it was very remarkable that Year, that theſe Inſects were ſo numerous and ſo troubleſome in the Air in a warm Day, that it was no ſmall Uneaſineſs to a Traveller, to avoid their beating in his Face, or flying into his Eyes.

The Solution of this odd *Phænomenon* cannot be difficult on the aforegoing Suppoſition; that Eaſterly Winds bring over the Eggs of Inſects, and when they are lodged in proper Places for their Maturity, lye there and hatch: I cannot ſee any other poſſible way to account for a living Creature's coming from the Heart of an entire Bean, and making its way *out* by force, but by ſuppoſing its Egg to be lodged in the Bloſſom, and afterwards encompaſſed with the Bean itſelf, as a proper Matrix to bring it to perfection by gradual Warmth †.

N. B. Some of the Beans had two or three Inſects in them and as many Holes.

There ſeems to be good reaſon to believe, (tho' I have made no Obſervation) that this is the Caſe of the common *Nut-Gall* ſo frequently obſerved to have one or more little round Holes in them; through which it is very probable ſome Inſect or other made its way, after it found itſelf brought to Maturity and had ſtrength to ſhift for itſelf.

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† *Query, Whether this may not give a probable Solution of the odd Production of Worms in human Bodies,* viz. *That their Eggs or Embrio's floating in the Air, are ſuck't in by the Breath, and in the Bowels brought to Maturity.*

I cannot forbear taking notice here of an ingenious Query a learned Friend has put relating to Blights, in a Letter to my ſelf, *viz.* from the known and demonſtrated Obſervation of the different Weight and Preſſure of the Atmoſphere at different Times, whether or no the *Air* in the Tubes or Veſſels of the tendereſt Bloſſoms, which by its elaſtick Power will dilate itſelf as the incumbent Preſſure is leſſened, may not poſſibly ſometimes break, or rather contribute to break their ſlender Sides; and by that means render the Bloſſom unable to perform its Office of ſupplying the Infant Fruit with proper Juices, which may be ſuppoſed one reaſon of Blaſts. I ſay *contribute* to break, becauſe I believe 'tis not *alone* ſufficient; but with the ſharp Particles of Winds may eaſily deſtroy the Hopes of the Year.

Many or indeed moſt Blaſts evidently ariſe from Injuries done to the *Stile* in the Middle of the Bloſſom, which being made brittle by the Froſt, the Winds eaſily break the Icy Juice in two, whoſe ſharp Angles cut the Veſſels; and ſo they become no longer uſeful, either to convey impregnating Matter to the *Embrio*, or to defend it from further Injuries. Thus far the Fact is certain, that the *Stile* in the Middle of the Bloſſom erecting itſelf ſomething higher than the reſt, is always the firſt part affected with Blights, and when that is diſcovered to be *riveled*, or to turn colour before its time, ſuch Fruit is to be given over as loſt. But it is eaſier to find out the *Cauſe* of the Diſeaſe than the *Cure*; and if I thought horizontal Shelters variouſly apply'd, would do nothing, I ſhould ſoon give over all other Remedies.

CHAP. XXV.

An Exhortation and Addreſs to the Nurſery-Men, throughout the ſeveral Parts of Great-Britain.

Gentlemen,

YOU are not perhaps ſufficiently ſenſible how much of the future Pleaſure and Profit of all ſuch as take delight in a Garden is owing to your Art, Honeſty, Contrivance and Care; and therefore to *you* I addreſs my ſelf, hoping you have Ingenuity enough to receive an Exhortation with Temper, tho' it comes from a Clergyman. And that what I have to ſay may be better underſtood, and make the deeper Impreſſion, I ſhall methodize it in the following Manner.

1. I would fain hope you will all agree with me, that it is both your Wiſdom and your greateſt Intereſt to act always upon the Principle of Honeſty and fair Dealing; and that in all your Correſpondence with the Gentlemen thro' the Kingdom, you make a Conſcience of ſending *Trees*,

Shrubs, and *Seeds* that are right and good. I ſpeak this here, not as a Divine and a Lover of Honeſty; or as if I thought Nurſery-Men and Gardeners more than others wanted that Caution; I would hope rather the contrary; but the Light I would ſet this matter in is this: Knavery and Deceit in a Nurſery-Man, wherever that happens, affects not the correſponding Gentleman ſo much in the Value or Loſs of the Trees, as in the Loſs of *Time*, and the Diſappointment he is thrown under. No Value or Conſideration almoſt can be ſet againſt the Loſs of three or four Years of the beſt part of a Man's Life; becauſe *that* can never be recalled, which makes the Injury *irreparable*, and the Deceit *barbarous*. Where there is Ingenuity, Honour and Honeſty, *this* which I have ſaid is ſufficient; and where there is neither, *more* would ſignifie nothing.

But before I cloſe this Head, I cannot but mention the Hardſhip a worthy Gentleman of my Acquaintance in *Northamptonſhire* underwent from the knaviſh Uſage of his Nurſery-Man; who in a pleaſant Irony told him. "It is true, you Gentlemen charge us (and very often juſtly) " with ſending you down bad Trees, and wrong Sorts; but though you " may think us *Knaves*, you muſt not ſay we are *Fools*; for we have " three *Hits* for it. Firſt, if the Tree I ſend you down be a wrong Sort, " or on a bad Stock, the *Tree* may die before it comes to bear, and then " the Fault is laid upon the Planter, or other Accidents and outward Injuries, and ſo I hear no more of that, but another is ſent for in its " room, perhaps of the ſame kind. Secondly, The *Gentleman*, who " ſends for the Tree, may chance to die before it comes to bear, and " then the next Heir blames the *Choice*, and ſends for another. Or " laſtly, *I* may die my ſelf, and then the Proverb takes place, *De mortuis nil niſi bonum*.

In ſhort, this merry Fellow cheated the Gentleman in almoſt every one of his Fruit-trees, either as to their Goodneſs or Sorts; and though after three or four Years he planted them all over again, yet I think he lived not to taſte much of his new Plantation.

2. Another piece of Advice I would give you, is to keep an exact Œconomy in your Nurſeries, ſo as to regiſter and methodize your Sorts in a moſt exact manner, keeping a Counter-part of the Nurſery in a Plan, in ſuch a manner drawn, that you cannot miſtake the Sorts when a Demand comes for them. The want of this I am very certain is the occaſion of many of the Reproaches caſt upon the Nurſery-Men: Whenas it was not *Knavery*, but *Ignorance*, and want of Method that occaſioned the Misfortune and Diſappointment. But the Complaint ſometimes is, that the Trees, though of right Sorts, yet are unthriving and ſhort-lived: To prevent which, you ſhould always take care to make uſe of right Stocks, eſpecially for *Peaches*; that you innoculate them on ſome of the larger Plums, *Bonum magnums*, *Muſcles* and *Pear-plums*, and that the tenderer Sorts of them be put upon Aprecots; the Gentlemen will not think much to give ſomething extraordinary for ſuch double Care, which would bring you Credit beſides. Indeed the *Paradiſe-ſtock* for Apples, and the *Quince* for Pears, are not and cannot be expected to laſt ſo long as Free-Stocks; and there are few who know any thing of them, who ſend for them with any other View or Expectation, but to have them bear ſoon and on low Dwarfs. But to have *Peach-trees* languiſhing for ſeveral Years, and, it may be, die before the Time, for being put on wrong and knotty Stocks; this Uſage Gentlemen are

wont highly to reſent; they *expect*, I am ſure they *deſerve* better from you. But,

3. Give me leave once more to addreſs my ſelf to you in another Article, which I am ſure will turn greatly to your Advantage, and wherein you will be highly ſervicable to your Countrey. The common Adage of *Ars longa, vita brevis*, frequently and naturally recurs to a Man's Thoughts; and the *oftener*, as he grows *older*. Now to make this melancholy Reflection ſit the eaſier on the Mind, the Way would be (if it could be hit on) to *ſhorten* Art and to *lengthen* Life. And give me leave to ſay, this, with reſpect to the Subject we are now upon, is effectually anſwered by what I am going to propoſe:

That you would always take care to have a ſufficient Number and Stock of Fruit-trees, of between four and ſix Years old; ready trained up, and ſpread; fit to be tranſplanted to any Diſtances not very remote, that when a Demand comes for a whole Plantation from a Gentleman, that has loſt and would gain ſo many Years of his Life, you may be able to anſwer him.

This is no airy Suppoſition that I am making, but a ſtrong Reality; for alas! it may eaſily be obſerved that the Love of a Garden doth not often ſeize a Man, till the other leſs innocent Gaieties of Life are paſt; and then, when Reaſon hath ſo far got the better of his Paſſions, as to ſhew him the Way how to fill up the Parentheſis of Life with ſome profitable Amuſements, how eagerly may ſuch an one be ſuppoſed to embrace an Offer and Method of recalling four or five Years of his paſt Life, or (which is the ſame thing) putting his Plantation in the ſame State in one Year, as would take four or five in the ordinary way to effect?

This thing my ſelf, as well as ſome others, have occaſionally mentioned; but without *preſſing* it, and without ſetting it in that true Light which the Importance of the thing requires. By what the World has experienced of late Years of your Ingenuity, Diligence and Care, in improving and cultivating Vegetables, you are moſt of ye ſufficiently capable of improving and putting in Practice theſe Hints: But you will eaſily excuſe me, if I throw in ſome ſuch Thoughts and Directions of my own which you may either *chuſe* or *refuſe*.

Some have recommended Frames of Wood or Tubs, wherein to plant Fruit-trees; which may be taken to Pieces at Pleaſure, when the Trees are removed to their proper Places. But however this may look in the Theory, the Method is ſo cumberſome, that I cannot find that it hath been ordinarily put in Practice, at leaſt in any Quantities. Some are ſanguine enough to think you need be under no Uneaſineſs about removing large Trees, even during the hot Summer Months, if the Roots be but immediately anointed with ſome of Mr. *Whitmil's prepared Gums.* It is good indeed to know all that Nature will do, and every thing that an Exigency or Neceſſity may require; but I could never yet ſee, why any one ſhould chuſe to put Nature to the Stretch in the hot Months, when there is ſo large a Share of the other Parts of the Year, when it may be done with the utmoſt Eaſe and Safety.

The Method which I would propoſe and recommend for common Practice, is to have always a ſufficient Number of Dwarf Fruit-trees planted in good ſtrong Baskets; which, if they are put into the Ground with the Trees whilſt they are green, will laſt two or three Years, and ſo may be ſhifted into new ones, as Occaſion or Neceſſity requires; for tho' the Trees will extend their Roots through the Baskets; yet when they are removed into other and bigger, they may be *ſhortened*, which will make their Roots more *matted* and the Trees fitter to be removed. And thus they may be trained up for four or five Years in the Nurſery, pruned according to Art, and their Branches extended and ty'd to upright occaſional Sticks in the Faſhion they are to ſtand, when ſet againſt the Wall.

Or if it ſhall be thought that Baskets will rot *ſooner* and not anſwer Expectation in Carriage, the Trees may grow in the naked Ground in the Nurſery ordered as above; and if the Diſtance is not great (for I would have Nurſeries in every *Market-Town*) taken up with Care and a little Art, they may be ſafely tranſplanted eight or ten Miles, with all or moſt of their Roots and Branches, without Earth. The Method of doing it, I would adviſe to be thus, as ſoon as ever the Tree is out of the Ground, ſecure the Roots as well as poſſible from the Air and Wind; and to do this effectually is the whole Myſtery of *Gums*, or vegetative *Mummies*; and yet every thing of a viſcous Nature, that is not corroſive, is a ſufficient Preparation without any more ado; ſuch as *Soap*, *Tallow*, *Wax*, *Greaſe*, or perhaps all of them mixt together is beſt to ſupple the Roots with all over; then let them be bundled up in Straw well matted for Carriage. And the Holes being ready prepared to receive them, let the whole Matter, fine Earth and Water together, be brought to the Conſiſtence of a Pap or Haſty-Pudding, round about and quite covering all the Roots; over which may be laid *Moſs*, *Fern* or *Weeds*, to prevent the too great Force of the Sun; which yet will dry and crack the Surface, that muſt for that Reaſon be ſometimes looſened and covered with freſh Mould.

I ſhould adviſe theſe Sorts of Removals to be made either in *October*, not too near the Beginning of Winter, or in *February*, not too near the Beginning of Summer; and then if there be any Degree of Care and Judgment uſed, you need not doubt of Succeſs; but may depend upon ſeeing (bating Accidents and unkind Seaſons) a reaſonable Quantity of Fruit the very firſt Summer, and *Plenty* afterwards. Foreſt-trees and Evergreens of all Kinds, may ſafely be removed with the ſame Care and Caution.

Gentlemen, I have had ſufficient Experience of what I here ſay to be right, and I exhort you to practiſe this, or ſome other analogous Method; as well for your own Intereſt, as for the good of your Countrey and the Delight of thoſe Gentlemen Lovers of Gardening, who I am ſatisfied will not fail to reward your Induſtry, and every ingenious Contrivance of your own to promote their Pleaſure and Profit.

CHAP. XXVI.

Of the Differences of Climates, with the Conveniencies and Inconveniencies of Soils, Situations and Degrees of Latitude.

IN the Buſineſs of Gardening, and for the Cultivation of late and tender Fruits and exotick Plants, there ſeems to be nothing more wanting, or more neceſſary to be explained, and ſet in a true Light, than the Knowledge of the real Difference of the Degrees of Heat and Cold, and the true Cauſes of that real Difference. For the Judgment that moſt People form of theſe Things commonly ariſes from weak and inſufficient Reaſons, or they lay a greater Streſs upon the *Cauſe* than can be ſupported by the *Effects* drawn from Experience.

For the Purpoſe; there is nothing more common than to hear People ſay, and to ſee Authors write, that if you once go two or three Degrees North of *London*, you muſt expect no good Fruit, eſpecially of the better and later Sorts; and Sir *William Temple* himſelf, in his *Garden of Epicurus*, was ſo weak as to ſay, " That when you get paſt *Northamptonſhire* 'tis to little Purpoſe to plant any of the beſt Fruits, as *Peaches* or *Grapes*: " And at the ſame Time commends his Friend in *Staffordſhire*, that he planted nothing but *good Plums* as the beſt Fruit he could attain, even by the Help of South-Walls, and a good Soil. And I have a Letter now by me from an ingenious Friend, which gives me an Account what pains he has taken in a *Statical* Way, to find what Influence the Sun hath on the Roots of Trees and Plants at different Seaſons of the Year, by the Means of *Thermometers*.

" Six of theſe he tells me he has provided, whoſe Stems are of different Lengths, from eighteen Inches, to four Foot. The Scales of theſe he divided into ninety Degrees beginning to number from the Freezing point. The ſhorteſt of theſe he hung in the open Air with a South Aſpect in the Middle of his Garden: The Ball of the ſecond he placed two Inches under Ground; that of the third four Inches: the fourth eight Inches; the fifth ſixteen Inches; and the ſixth twenty four Inches under Ground. Their Stems, which ſtood above Ground, were ſecured from Injuries and Weather by long Boxes; on which the Scales of Degrees were fixed. I keep (ſaith he) a Diary of theſe, whereby I know exactly the Sun's Warmth in the open Air, and at thoſe ſeveral Depths under Ground, at all Times of the Year. If now the like Obſervations were made ſo much further North as you are, 'tis probable that by comparing both together many uſeful Obſervations might ariſe in the Way of Husbandry and Gardening. Tho' you live in a fruitful Soil for Corn and Graſs, and the hardy Kinds of Plants; yet I believe you, who have ſuch a Taſte for Gardening, muſt have but too much Occaſion to lament your being removed ſo

" much further from the benign Influence of the great univerſal Genius
" of Vegitation.

This ingenious Gentleman ſeems to be of the common Opinion, and to have entertained Prejudices againſt our Countrey: But this I ſay that I, who have lived all the former Part of my life in the Middle and Southern Parts of *England*, and have been no incurious Obſerver of Vegitables and Taſter of Fruits, can with Truth aver, that I never eat *more* nor *better* Fruit even of the *later* kinds (except Grapes) than ſince I came into the *Biſhoprick of Durham.* And the Want even of Grapes is owing to ſuch Cauſes as may eaſily be remedied: For it is but lately, that the Gentlemen have had Courage enough to plant many; and where any Vines *are* found, they are either of the lateſt and worſt Kinds, or the Soil and Situation are not favourable; and which is ſtill worſt of all, very few Gardeners know how to prune them.

And then again, as to the *Times* of ripening, where the Soil is good and warm, and the Situation well ſheltered, as it ought, I ſee very little Difference between 51′ and 55′. The firſt Year I came hither, I had a ripe Aprecot, of the early Kind, ſent me the laſt Day of *May*, and on the ſame Day a Diſh of young Carrots, reaſonably large, ſown in the Spring; and in the Year 1724, when my Lord Biſhop came to *Aukland* the firſt Week in *July*, he had an handſome Preſent of large *Turkey Aprecots* full ripe ſent him from *Lumley Caſtle*, the Seat of the Right Honourable the Earl of *Scarborough.* There is little Judgment to be made of Climates and Soils from any of the artificial Ways of raiſing Fruits, which are practiſed round about *London*, to the Surpriſe and Wonder of many; who do not conſider, that in a *ſheltered* Place all thoſe Curioſities may be as eaſily had in any Part of *England*, and would turn to as good Account, were the Markets like thoſe of *London* (where every Novelty quickly meets with a Purchaſer) ready to take them off.

Neither can I ſee at preſent of what Uſe the Ingenious Mr. *Hale*'s Obſervations made from *Thermometers*, can be, nor what certain Judgment can be formed from thence relating to the Difference of the Sun's Heat for ripening Fruits in different Climates. I have formerly publiſhed Tables of the true and real Quantity of the Sun's Heat in ſeveral different Latitudes, I have given the ſame corrected above and thereby demonſtrated of what Quantity the mathematick Difference is in three or four Degrees. The greateſt and moſt conſiderable Difference of Heat and Warmth for ripening Fruit ariſes from the Nature and Circumſtances of Soil and Situation; from a Place lying on the South or North Side of a Hill; from its being on the Top of a cold Hill or in a Vale; from its being ſheltered or not ſheltered from Winds; from its lying on a cold Clay, or on a warm Sand or Gravel. Theſe are the Circumſtances chiefly to be regarded.

For Inſtance; It is plain to a Demonſtration, that a Garden lying on an eaſy Slope on the South Side of an Hill receives more of the Sun's Rays than the ſame Quantity of Ground lying on a Plane, and indeed hath more real Advantage of Heat from the Sun than ſeveral Degrees of Southern Latitude would give it, *cæteris paribus.* And the Argument is ſtronger ſtill if the Ground ſlope to the North. The ſame thing is to be ſaid with Reſpect to cold Clays and warm Gravels; the being guarded or not guarded from Winds. I remember ſeveral Years ſince I was at a

Place called *Margaret Overton* in *Rutland* (which is about the Middle of *England*) in the latter End of *Auguſt*; and then the *Merella-Cherries* againſt a Weſt-Wall began only to be *red* on one Side, the Place ſtanding on a Hill expoſed to Winds from every Quarter, whilſt at the ſame Time in the neighbouring Place in the Vale, I eat excellent *Peaches* and *Nectarines*; and from what I have found ſince I came into the Biſhoprick of *Durham*, I might have had the ſame Cherries on the ſame Expoſition full ripe above a Month ſooner.

I could name ſeveral Inſtances in this Countrey where the ſame Difference may be obſerved, and from the ſame Cauſes. At a Garden of the Right Honourable the Earl of *Scarborough* at *Lumley-Caſtle* before mentioned. At *Cheſter*, the Seat of my worthy Friend *John Hedworth* Eſq; at *Branſpeth*, the Seat of *William Bellaſis* Eſq; at *Beamiſh*, the Seat of *William Daviſon* Eſq; at *Hilton-Caſtle*, the Seat of *John Hilton* Eſq; which *laſt* is not above two Miles from *Weremouth*; and yet the Situation of *that*, and the reſt before mentioned (beſides ſeveral others, eſpecially all along the River *Were* not mentioned) is ſo favourable, and the Soil ſo warm and good, that there is not leſs Difference than three or four Weeks in the ripening of Fruits, &c. between *thoſe* and *mine*; altho' I lay in ſome Sort of Claim to an Experience and Knowledge in the managing my Trees: And yet there are ſtill ſeveral Places in this Countrey, and in the ſame Latitude colder and leſs favourable to Fruits than my own; by Reaſon they have neither a good Soil nor any Shelter from Winds; the *firſt* of which Negatives is not my hard Fortune, tho' the *laſt* is.

I cannot but here take Notice (as an Inſtance of the favourable Situation of *Branſpeth*) of the uncommon Extent of ſome well bearing Fruit-trees there to be found in my Friend Mr. *Bellaſis*'s Garden. *viz.* There is an Aprecot-tree there, whoſe Height is thirty Foot, and its extended Breadth is no leſs than forty four Foot. There are alſo three large Pear-trees planted againſt the Caſtle Walls; the one is a *Bergamot* (which every one knows is of the tenderer Sort) its Height is forty one Foot, and its Breadth forty three. Another is the *Windſor* Pear, whoſe Height is thirty three Foot, and its Breadth thirty. The laſt is a good Pear, and what they call in this Countrey the *Biſhops* Pear, whoſe Height is thirty three Foot, and its extended Breadth no leſs than fifty five Foot.

I have been the more Particular on this Head; becauſe great Impreſſions have been made on the Minds of unexperienced and injudicious Perſons, who have received great Prejudices againſt the Doctrine (clear as it is) which I have here laid down; and will ſtill be apt to fancy with my ingenious Correſpondent, that nothing better than a *Currant* and a *Gooſberry* or a *Plumb* can be had on the wrong Side the *Trent*. And when ſuch Perſons come here amongſt us, and taſte our Fruits, they are apt to taſte them with preconceived Opinions of their little Worth, and *Northern* Reliſh.

However I am not willing to let this Diſcourſe end or reſt here neither, becauſe the *whole* of this Matter is not yet ſet in a right Light. And indeed I have not met with any Author that has hit upon the true Reaſon of the Difference of Climates, and of the Want or Plenty of late Fruits.

London itſelf, and the Countrey for ten Miles round, hath indeed ſomething to boaſt of with Reſpect to Climate, on the Account of the vaſt Numbers of People and Fires, which influence and warm the Air all around. But ſetting that Conſideration aſide, *Great Britain* itſelf muſt be deemed and lookt upon as what it is, an *Iſland*, and an *Iſland* that is ſubject to many outward Misfortunes and Inclemencies of the Air, which the *Continent* is much more free from. All our northern Iſlands we know, (and we experience our own) to be ſubject to frequent Winds brought to us from every Sea all around. We alſo experience much greater Uncertainty of Weather, more Clouds and leſs Sun-ſhine, than they who live on the *Continent*, as every one knows, who hath experienced the Difference by ſeeing and obſerving both. So that altho' there is a manifeſt and ſenſible as well as a real Difference in a Remove from *London* to *Paris*, and ſo on; yet it is to be taken notice of, that that is a Remove from an *Iſland* to a *Continent*; from an *Iſland* ſubject to continual Clouds, cold Winds, and great Uncertainty of Weather, to a *Continent*, whoſe Air is generally ſerene, and whoſe Springs eſpecially are warm and favourable to the Fruits of the Earth. Whereas it is a quite different Thing when you remove three or four Degrees from one Part to another of an Iſland, every Part of which is equally ſubject to Clouds and Winds: 'Tis to little Purpoſe *here* to talk of wanting in the North of *England* the Sun's meridian Altitude, or the *benign Influence of the univerſal Genius of Vegetation*; when, alas! the whole Iſland wants it. Every one who has been abroad in *France* or *Spain*, *&c.* and hath obſerved the Serenity and more equal Temperature of their Air, know that they have ſeldom many intire cloudy Days together, as we have ſometimes ſeveral Weeks, and that if we have *one* ſerene Day of Sun-ſhine they have *ten*; which occaſioned that merry Reflection of the *Venetian* Ambaſſador in King *Charles*'s Time, who when he was ask'd by his Friend going away to *Venice*, if he had any commands, gave his Service to the *Sun*; having during his Reſidence of three Weeks, been never able to ſee him or make his Complements to him.

Upon the whole; It is on all Hands confeſſed, that there is a Difference of the Sun's Summer Heat in different Latitudes, although not near ſo much as People are wont to imagine in three or four Degrees; but then that Difference is much leſs to be diſcerned in an *Iſland* than in the *Continent*, for the Reaſons given above. The Sun is a Bleſſing to Vegetation when and wherever it ſhines; in the *Continent* this Bleſſing they enjoy in Proportion to their Situation and Climate; we that live in an *Iſland*, though we have mathematical Reaſons to expect a ſufficient Influence of the Sun to ripen our Fruits, have the Misfortune of almoſt continual Clouds which intercept the Sun; ſo that its Influence, ſuch as it is, we want, we have it not; which is the Complaint of the whole Iſland, and ſhould ſilence all Triumphs of one Part over another on the Account of *Latitudes*; whenas the beſt and trueſt Reaſon of Difference between *good* and *bad*, between *fruitful* and *unfruitful* Places, is (as I have above obſerved) to be taken chiefly from the Nature of the Soil and Situation.

In ſhort; you cannot much more expect Succeſs in gardening on the elevated Plains of *Salisbury* or *Honſlow-Heath* in 51' than you can in the Weſtern *Fells* or open *Waſtes* in 55, in the Biſhoprick of *Durham*. *Both* are left naked and expoſed to the Rage of mercileſs Winds; tho as I have in another Place obſerved) I think they are more raging in the *North*, by Reaſon of the Narrowneſs of that Neck of the Iſland between the two Seas.

As a *Corrollary* from the whole Doctrine here laid down, we ſee the true Reaſon between the Summer Heats at *Moſcow* and thoſe at *Newcaſtle*, both lying in the ſame Latitude of 55. The *Firſt* lyeth in the Middle of a large Continent, where the Air is generally ſerene, and the Sun powerful according to its meridian Altitude, inſomuch that Melons *there* are raiſed with little Care and to great Perfection; whilſt in the ſame Latitude in the North of our Iſland, (except in the beſt and moſt ſheltered Places) few of thoſe or of the lateſt Fruits with the utmoſt Care are found to be good and well-flavoured.

From hence alſo we are taught the true Reaſon of that Goodneſs and Earlineſs of Fruit in our Iſland which we experience in ſome Summers, ſo much more than in others. That is to ſay, when our Summers prove (as ſometimes they do) ſerene, dry, and hot; when we enjoy the Bleſſing of the Sun without any great Interpoſitions of Clouds, (the Effects of which are colds and wet) then we find the *Excellence*, as well as *Plenty* of all our late * Fruits; ſuch as may even vie with thoſe of *France*. As for Example, in thoſe two remarkable Years 1718. and 1719. both the Springs and the Summers were ſo warm and hot on the Account of ſerene Sun ſhiny Weather, that I remember in *Northamptonſhire* we had the *white Muſcadine Grapes* in great Plenty and Perfection by the Middle of *Auguſt*, and all other late Fruits in Proportion.

Whereas, in moſt of the Years ſince, we have had throughout the whole Iſland ſuch unkind unſeaſonable Springs, ſuch cloudy, rainy, cold Summers, that hardly any of our late Fruits (except where the Circumſtances of Soil and Situation have been extraordinary) have come to their proper Maturity and Flavour; as it hath been more particularly remarkable the laſt Year 1725; when as far as I can hear, there hath been no ſuch thing as a ripe Bunch of Grapes throughout the Iſland, at leaſt in the natural or unartificial Way.

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* *Mr.* Evelyn *obſerves that the* Peach *was at firſt accounted ſo tender and delicate a Fruit, that it was believed to thrive only in* Perſia; *and even in the Days of* Galen *it grew no nearer us than* Egypt, *of all the Roman Provinces, but was not ſeen in the City till more than thirty Years before* Pliny's *Time. Even the* Damaſk Roſe *itſelf (ſaith my Lord* Bacon) *is little more than a Hundred Years old in* England. *And (as my Author goes on) it was Six hundred and eighty Years after the Foundation of* Rome, *e'er* Italy *had taſted a Cherry of their own; which being then brought thither out of* Pontus *(as the Philberts were) did afterwards travel* ad ultimos Britannos. *Evel. Diſc. of Forreſt-trees. Pag.* 115.

A NEW

A

NEW SYSTEM

OF

AGRICULTURE

AND

GARDENING.

BOOK IV.

Of the Kitchen-Garden.

CONSIDERING how many have wrote upon this Subject, and how well it is at preſent improved and underſtood, every one almoſt that wears a blue Apron, thinking himſelf already thoroughly inſtructed, it might hardly be expected that I ſhould enter into this, which is now no longer a Secret; yet foraſmuch as every Day's Experience adds ſome Degree of Light to a practical Art, I flatter my ſelf that ſomething acceptable even in the Article of the *Kitchen-Garden* may occaſionally be delivered, that may either ſtrike the Fancy or inform the Judgment of the Curious. However I ſhall take Care, ſo far at leaſt, not to impoſe upon the Publick, as to dwell on trifling Things, or to enlarge on Things already well underſtood.

CHAP. I.

Of Melons, Cucumbers, Pumpions, Gourds, &c.

THE ſeveral kinds of *Melons* being reckoned the beſt Fruit in the Kitchen-Garden; and now every Day, as they are better known and eaſier raiſed, are much coveted by moſt curious Palates, I ſhall begin with a plain Deſcription of the beſt Sorts, with ſome eaſie Inſtructions how to raiſe them; without confounding the Reader with all the different Methods, which ſome by way of Singularity affect to practiſe.

There are ſome of the large *Melons* that are *good*; but the *biggeſt* are not generally the *beſt*. However it is with this Fruit as with moſt others; that which *pleaſes* one Palate *diſpleaſes* another. It is proper to procure ſome of the Seeds of the beſt and moſt approved Sorts, both of the *ſmooth*, the *wrought*, and the *rib'd* Kind, from *France*; that when you have found the Sorts that pleaſe, and will ripen well and kindly, you may ſtick to thoſe, by carefully preſerving their Seed; which Seed however ſhould not be made uſe of till it be at leaſt three Years old: For *new* Seed is apt to throw out large and ſtrong Vines, but is ſeldom prolific; whereas the Seeds of Melons and Cucumbers, which have been kept eight or ten Years, generally produce Vines that are *cloſe-jointed*, and more ſubject to produce Fruit. I have known the Seeds of Melons kept fourteen or fifteen Years, and have grown and anſwered very well.

But becauſe a well choſen *Meloniere*, and a Succeſſion of regular *Hot-Beds* are two things abſolutely neceſſary for the Production of good Melons, it will be neceſſary to give diſtinct Directions concerning them. For without the *Firſt*, *viz.* a well-choſen *Meloniere*, all future Diligence in other Particulars would be in vain. Chuſe out therefore a Place in your Kitchen-Garden the moſt ſecured from pernicious Winds, about twelve or fourteen Yards ſquare, and this you are to encloſe with a Reed-Hedge eight or ten Foot high, well ſupported with ſufficient Stakes or Poſts fixed in the Ground, leſt the Winds overturn them: But becauſe Reed-Hedges are not of above ſeven or eight Years Continuance, it will be very convenient for more laſting Uſe to plant Hedges within the Encloſure, that may be growing up to anſwer the aforeſaid Purpoſe. *Yew* and *Holly* are the beſt, and with a little Patience become impenetrable Defences againſt the Winds all the Year; but *Elm* and *Hornbean* do very well.

After this Care is over, the next thing to be done, is to provide a Succeſſion of regular Hot-Beds; for without the Aſſiſtance of theſe, our Climate ſeldom proves ſo kind as to afford ripe Melons, at leaſt in any Quantity. Though I remember about twenty Years ago I once tried, and put a Melon-ſeed into the naked Ground on *May-Day*, and from that I had an exceeding good Melon, the fourth of *September* following. And indeed would our Summers prove but favourable enough, we might then expect that true Reliſh of the Melon, which the Southern Countries juſtly boaſt of; where they naturally grow like Turneps. For, as I have elſewhere obſerved, pure wholeſome Mould gives a ſweet Taſte to all Sorts of Plants; whereas Dung, though it helps Vegetation, yet contains many noxious heterogeneous indigeſted Juices, which give ſtrong and unſavoury Taſtes to every thing ſowed upon or planted in it. Gent Recr. page 89.

However, ſince ſo delicious a Fruit as the Melon cannot ordinarily be had without the Aſſiſtance of the Hot-Bed, it is well worth while for thoſe who can afford Hands and Attendance to be well provided in this Article; and although the Buſineſs of the Hot-Bed is now generally pretty well underſtood, yet I ſhall lay down theſe following plain and ſhort Directions.

It is well known that only the Dung of Horſes, Aſſes and Mules is fit for the Purpoſe of a Hot-Bed, the Dung of Oxen, Cows, and Hogs, retaining little or no Heat when laid together in Heaps. A convenient Quantity therefore of the former, of the laſt three Weeks making in the Stable, ſhould be reſerved and laid in a Place by it ſelf. In the firſt Week in *February*, mark out a Place in the *Meloniere* a Foot more extended every Way than the Frame you intended to ſet upon the Hot-Bed, (ſuppoſe eight Foot long and four Foot wide) facing the South; then take out the Earth ſix Inches deep from this oblong Square, and let the Dung be brought by one Man in a Barrow, whilſt another ſhapes the Bed; not in Hills and Hollows, but regularly and evenly, *treading* it all the while, till at laſt it be four Foot high from the Foundation, when four or five Inches depth of Earth is laid upon it. Artificial Earths or thorough rotten Dung are generally uſed; but the richeſt (not Sandy but loamy) *untried Earth* that can be got I prefer. The Bed thus prepared (if the Dung is moſt of it new and freſh) will not have loſt its ſcorching Heat in leſs than eight Days; and therefore nothing muſt be ſowed in it till *that* is over. It is thought by moſt adviſeable to have a thin Coat of Sea-coal Aſhes laid upon the Bed before the fine Earth be introduced; becauſe *that* is found to retain the Heat, eſpecially if the Mould it ſelf be preſſed down hard with the Hand as it ſhould, and after that remain five Inches deep: For want of which the Roots of the Plants frequently reach the Dung, which is Poiſon to them.

But foraſmuch as no Hot-Bed can be ſuppoſed, without ſome Help, to maintain its Heat long enough to bring what we plant upon it to Perfection; therefore when it begins to grow cool, the common Practice is to cut away the Sides of it ſlopewiſe, adding freſh Dung to recover its loſt Heat. This is called *Backing* or *Lining* of a Bed. And this the diligent Gardeners will repeat five or ſix Times in a Seaſon, as they ſee Occaſion, rather than make freſh Beds, which occaſions a Remove of the Plants, and is conſequently a Check to them. However this leads me to repeat a Contrivance of ſome Gardeners, which I have formerly mentioned: And may perhaps deſerve ſtill to be improved. Gent Recr. page 93.

“ Inſtead of making the Glaſs Frames, as is uſual, open at the Bottom,
“ they may be made with ſtrong Wires croſſing one another, ſo as to be
“ able to ſupport a Bed of Earth four Inches deep for the ſeveral Plants
“ to grow in. And thus the whole may be lifted by four Men from
“ one Hot-Bed to another, as Occaſion ſerves. This Method hath theſe
“ two conſiderable Advantages attending it. Firſt, this ſaves the Trouble
“ and prevents the Danger of *tranſplanting*, which *often* proves fatal,
“ but *always* a Check to the Growth of theſe tender Plants. Secondly,
“ here is no Intermiſſion in the Growth of the Plants, nor any artificial

" Heat of the Bed waſted, which in the ordinary Methods cannot be " avoided; for there you muſt wait ſeven or eight Days 'till the great " Heat be abated, leſt the tender Roots of the Plants be ſcorched: " Whereas in the Caſe before us, you may allot juſt what Degree of " Heat you pleaſe; for when the Heat is too violent, the Frame may be " placed ſomething hollow from the Bed; when it abates, it may wholly reſt upon it: And when the Bed grows too cold the Frame may " be carried to another.

Beſide theſe, there are other Sorts of Beds made of long Dung fit to receive the Plants raiſed in the other; theſe are called *Deaf-Beds*, being made almoſt wholly *within the Ground*, and therefore will give only a *ſweating Warmth* to the new-removed Plants for a little Time till they have juſt taken root, and can ſhift for themſelves, only with the Help of Bell-Glaſſes. Theſe Beds ſhould not be made till the middle of *April*, that the Summer may advance Time enough to forward and perfect the Fruit.

If there ſhould at any Time happen to be a Defect or Want of good Dung from the Stable, there are ſome other Materials which will cauſe a ſufficient artificial Heat, *viz.* Straw ſteeped in Pond-Water two or three Days, Graſs, Weeds, and Cole-Aſhes, Grains of Malt, Tanners Bark, damaged Bran made wet: Any of theſe thrown together in a Heap, and well watered will ferment, and give a regular Heat and Warmth, proper for accelerating the Growth of tender Plants.

After the ſcorching Heat of the Bed is over (which may be diſcerned by a Finger thruſt in) then is the Time to put in the Seeds, Melons at one end, and Cucumbers at the other; if the Bed be in good Temper they will come up and be fit to plant out four Inches apart about a Week after ſowing; where they are to remain till the ſecond or third Joint appears, when the prime Leader is to be pinch'd off from each Plant; and upon their careful Remove into a freſh Bed, they will quickly put out three other Runners, which commonly produce Fruit plentifully.

About the latter end of *April* the Melon Plants thus raiſed will be fit to plant upon Ridges four Foot wide in Holes, two or three Plants in a Hole, and the Holes are to be four Foot aſunder. Some provide an Inſtrument of Tin, ſomething of the Shape of a Spoon, wherewith to remove the Plants from one Bed to another without much diſturbing the Roots; and a Dexterity in doing this is of great Advantage to the Plants. Sprinkle the Plants with Pond-Water, and cover them with Glaſſes: Immediately upon which, Mats or Straw ſhould be laid round the Glaſſes to keep the Plants from withering. For though the Sun be the Life of Vegetation; yet to every thing weak, or newly removed, it often proves fatal, by its overpowering Glory. Cucumbers are to be managed much after the ſame Sort, only they require *no pruning*, and *more watering*.

About the latter end of *May* they will be puſhing ſtrongly forward, and then is the Time when the Earth on the Ridges, eſpecially round about the Plants, is to be trod *hard* down, the *harder the better*, to keep the Roots cool, and the Sun's Rays from penetrating too far. As ſoon as the dry Eaſterly Winds ceaſe, the Glaſſes ſhould be tilted up about an Inch in the Middle of the Day to give them Air for two or three Hours, that by Degrees they may be hardened to the Weather.

Whether thoſe called *falſe Bloſſoms* are the *Male* Flowers abſolutely neceſſary to impregnate the others; and *therefore* ſhould be let alone, I am not able to ſay; having not had ſufficient Experience thereof, and withal not being thoroughly ſatisfied with Mr. *Bradley*'s Hypotheſis (probable as it ſeems to be) of the *Generation of Plants.* However I think it is the ſureſt Way to let the falſe Bloſſoms alone: For the Notion the common Gardeners entertain, that they weaken the Plant, is *trifling.* Nature ſeems to deſign them for ſome Office, by their dying away ſo ſoon after their firſt Appearance; as if having done their Duty, they were to retire. I am alſo inclined to think with Mr. *Bradley*, that the common Practice of *handling* ſo much and diſpoſing the Vines in an exact Order doth a great deal of Harm: The Veſſels in theſe Plants are extremely tender, and ſubject to be bruiſed by the leaſt bending from their Place of natural Growth; and accordingly it is obſerved that both Melons and Cucumbers diſcover their firſt Fruit in Places and Corners leaſt diſturbed or thought on. The *Claſpers* which Nature has furniſhed theſe Kinds of Plants with, are by no Means deſigned for their *climbing*, as hath been conjectured by ſome: They are manifeſtly *reptile* Plants. The Tenderneſs and Weakneſs of their Vines plainly demonſtrate they are not well formed, and little able to ſupport the Weight of their Fruit, or defend themſelves by ſuch weak *Claſpers* from Winds and Storms; which of all things affect them moſt. Therefore what Nature ſeems to deſign by their *Claſpers* is, that they may lay hold of every little Weed growing round them, that thereby the ſeveral Branches for Fruit may be held and preſerved in their natural Order and Diſpoſition without moving to and fro. And this Inclination of Nature we ſhould ever follow.

After the greateſt Part of *May* is over you may take off the Glaſſes, and uncover the Melons from ten in the Morning till four in the Afternoon, thereby to acquaint them with the Air, and by Degrees to fortify them againſt unſeaſonable Weather. But great Care muſt be had to guard them againſt ſuddain Storms of Hail and Rain: For too much Wet, eſpecially at their Roots, occaſions them to rot. But if the Weather prove exceeding hot and dry, you may water them in a Circle at ſome little Diſtance from the Root with Pond Water impregnated with Deer's, Sheep's, or Pidgeon's Dung.

When the Plants are become ſtrong, and throw out ſeveral Runners, let the beſt and ſtrongeſt remain after being pinch'd off at the third or fourth Knot: But the weak Shoots, and ſuch as grow *flat* muſt be entirely removed. When you perceive two or three Melons knotting and ſetting for Fruit upon one Shoot, ſtop that Vine, pinching it off at a Bud or two beyond the laſt Fruit; which when it is once as big as your Fiſt, you ſhould lay upon a Tile, whereby to reflect the Sun's Heat, and to accelerate its ripening: And after that, watering ſhould be diſcontinued, except in exceſſive Droughts, and *then* the Water ſhould be adminiſtred only in the Alleys.

To know when a Melon is fit to be gathered, the Stalk will ſeem as if it would part from the Fruit; it will begin to gild and grow yellow underneath, and you will be ſaluted with a moſt agreeable Odour; but ſuch as frequent the *Meloniere* judge it by the Eye, obſerving only the Change of their Colour and the intercoſtal Yellowneſs, which is a ſufficient Indication of their Maturity. From the Time of a Melon's being fully ſet, to the Time of its ripening you may reckon forty Days; and thoſe which are full of Embroidery and Net-work are commonly fourteen or fifteen Days faſhoning e're they be ripe.

In gathering a Melon *a-la-mode*, the Stalk ſhould be furniſhed with two or three Leaves for Ornament; neither ſhould the Stalk be ſuffered to break off, leaſt the Melon languiſh and loſe the Richneſs of its Flavour. If the Melon is to be conveyed to any diſtant Place, it ſhould be gathered three or four Days before 'tis full ripe, if that could be gueſſed. But if they are to be uſed immediately thoroughly ripe, put them into a Bucket of Water newly drawn out of the Well, juſt as you would treat a Bottle of Wine; ſince coming immediately from the *Meloniere*, they are *Sun-heated*, wanting that Quickneſs and agreeable Flavour which the cold Water gives.

In the Choice of a perfect good Melon, let it be neither two green nor over-ripe; let it be well nouriſhed with a thick ſhort Stalk proceeding from a vigorous Plant, firm to the Touch, dry, and of a vermilion Colour within. And its true Flavour is of that pitchy Mixture wherewith Seamen dreſs their Cordage. The Superſtition of the Antients derived to ſome of our Moderns with Reſpect to the Moon, and the Approach of Females is very ſilly and ridiculous. But from *weak Minds Superſtition is hard to be rooted out.*

Cucumbers are ſown and raiſed much after the ſame Method with Melons. There are ſeveral Sorts of them; but the *prickly* Sort is accounted the beſt. They muſt be plentifully watered both on the Hot-Bed and Ridges, if you would have them produce Plenty of Fruit. They are in Perfection a little before they begin to turn Yellow. The firſt ripe both of theſe and of the Melon ought to be choſen for Seed: But the Cucumber deſigned for Seed ſhould be ſuffered to grow till the Froſts come.

Cucumbers deſigned for pickling require no more Care than to chuſe a Piece of natural Ground pretty rich and well expoſed to the Sun; wherein make Holes in the Form of Baſons about four Foot diſtant from each other; and the firſt Day, if the Weather be ſettled, or the firſt Week in *May* ſow the Seeds in them, not *ſparingly*; for it is better to have Plants to ſpare, than to want, which often happens by being too *covetous*.

All the ſeveral Sorts of *Pumpeons* and *Gourds* ſhould have ſome Aſſiſtance from the Hot-Bed, that they may come to their Maturity before the Froſts overtake them; in the beginning of *May* they may ſafely be removed to ſome very rich Bank, where they may have room to extend their Vines; where if they be well watered, eſpecially during their fruiting, Plenty of Fruit may be expected, and of a prodigious Size, ſometimes weighing eighteen or twenty Pound; whatſoever is wrote upon the Fruit with the Point of a Pin, when it is ſmall, will be vaſtly enlarged as the Fruit encreaſeth, and appear prettily viſible in Ribs. So the Lover in his Gaiety ſilently addreſs'd himſelf to his Miſtreſs, when he wrote upon the young Gourd,

The Rind of every Plant her Name ſhall know,
And as the Plant extends my Love ſhall grow.

They ſhould be gathered about the latter End of *Auguſt*, and carefully laid to dry in the Sun; but the Froſt quite ſpoils them. Some mix them with the ſharpeſt kinds of Apples for the Kitchen; and others in a time of Scarcity, eſpecially after it is boiled, mix the Pulp of it with their Dough for Bread.

Before I leave the *Meloniere*, it may not be amiſs to ſay a Word or two of *Muſhrooms* raiſed in an artificial Way. They are doubtleſs produced from ſome Putrefaction in the Earth. We are told of near an hundred different Kinds, beſides thoſe very minute Sorts diſcerned only with the Microſcope in the Mouldineſs of Fruits and Liquors; which laſt Kinds are ſo quick of Growth, that (as Mr. *Bradley* obſerves) in leſs than twelve Hours time they are perfected, and ſhedding their Seeds, ſeveral Hundreds of the ſame Kinds immediately vegetate, whence it is that Mouldineſs ſo ſoon overſpreads thoſe Bodies it once infects.

There are *Troufles* found at *Ruſhden* in *Northamptonſhire*, and *Morelles* in ſome Parts of *Wiltſhire*; but there is but one Kind of Muſhroom properly ſo called, which is edible, and thoſe are found in moſt Places in *England*; eſpecially after a wet Seaſon in Autumn. But the artificial Way to have them moſt Parts of the Summer in a Garden is, by preparing a Bed of long Dung from the Stable, putting ſome ſhort old Dung on the top, four Fingers thick: When the great Heat is qualified, ſcatter all the Parings and Offals of ſuch Muſhrooms as have been dreſſed in the Kitchen, together with the Water wherewith they were waſhed. The ſame Bed will ſerve two or three Years, and will aſſiſt you in making another. Inſtead of Horſe-dung ſome have of late uſed old Thatch, which is obſerved to turn muſty and to grow mouldy ſooner than Horſe-dung, and conſequently to produce Muſhrooms quicker and in greater Plenty. The old Melon-Beds, if well watered in the Spring, ſeldom fail to produce Plenty.

CHAP. II.

Of Artichokes, Chardons, and Aſparagus.

THE *Artichoke*, tho' of the *Thiſtle* Kind, is one of the moſt excellent Fruits of the Kitchen-Garden, and recommended not only for its Goodneſs in all the various Ways of cooking it, but alſo for its continuing near three Months in Seaſon. Of theſe there are ſeveral Sorts, chiefly the *red*, the *violet* and the *green*, which *laſt* for its Largeneſs is generally moſt admired and ſought after. *Artichoke.*

They are propagated by Slips from the old Roots in the Beginning of *April*; which Slips ſhould be planted in as rich Soil as poſſible, (*untried* is beſt) at four Foot aſunder in Rows and in the *Quincunx* Order. When you take off the Slips, only three or four Heads ſhould be left on the old Root, which ſhould not be all at once uncovered, but gradually at ſeveral Times, leſt the cold Winds and ſharp Mornings pinch them too much. They need little Culture before Winter, but to be kept clean from Weeds; and the young Plants muſt be carefully and frequently watered if the Weather prove dry: In *November* the Tenderneſs of this Plant expects Relief, which is either by putting long Dung round every one; or elſe to make Trenches betwixt every two Ranges, covering them within a little of their top with the Mould. This laſt Method is the moſt expeditious, and except in very long and ſevere Winters is found ſufficient. The new-planted Sets ſhould not be ſuffered to bear the ſame Year; for thereby the Roots are often endangered; and every fifth Year there ſhould be a Renewal; for it is a Plant that ſoon impoveriſheth the Soil, and then the Fruit becomes ſmall.

The old Roots, which are not accounted of, are commonly made uſe of to make what the *French* call *Artichoke Chards*; for which Purpoſe they tie them and cover them up at their whole Length, with Straw or old Dung, which whitens the cotteny Sides of their Leaves and makes them fit for Uſe after boiling.

Spaniſh Chardon. The *Spaniſh Chardons* are propagated only by Seed ſown in *May* (and not ſooner) in prepared Trenches or Pits a Foot wide, and about ſix Inches deep of fine Mould. After they are come up, they muſt be well watered: And towards the End of *October*, when we would blanch them, we muſt tie them and cover them up with dry Litter, well twiſted about them, ſo that the Air cannot get at them. In about fifteen Days they will be whitened and fit for Uſe, boiled as the *Artichoke Chards* before mentioned. The *French* and *Spaniards* uſe the Flowers of theſe *Chardons* inſtead of *Rennet*; for being dried in the Air, they quickly and readily turn and curdle the Milk.

Aſparagus. *Aſparagus* is ſo neceſſary a Part of the Furniture of a Garden, and ſo early a Dainty in the Spring, that its Management and Culture juſtly deſerve a particular Enlargement. It is raiſed from Seed ſown in the Spring on ſome well prepared Ground; and after it has ſtood two Years in the Seed-Bed, the Plants are then fit to be removed into a regular Bed; where if rightly prepared and managed, they will continue good and ſtrong for fifteen or twenty Years; eſpecially if the Soil be naturally rich and ſandy. There ought to be great Care taken to gather the Seed from ſome of the ſtrongeſt Plants; for therein conſiſts a great deal of the expected Succeſs of having a large Kind.

It is not deſirable to have the Plants either too big or too little; but when you have them ready for the Purpoſe, whether of one or two Years Growth, mark out a Piece of Ground, ſuppoſe eight Yards long, and four Yards wide. Take from hence *entirely* the Mould for twelve Inches deep, filling it up again with the beſt *untried Earth* that can be got to the ſame Level it had before.

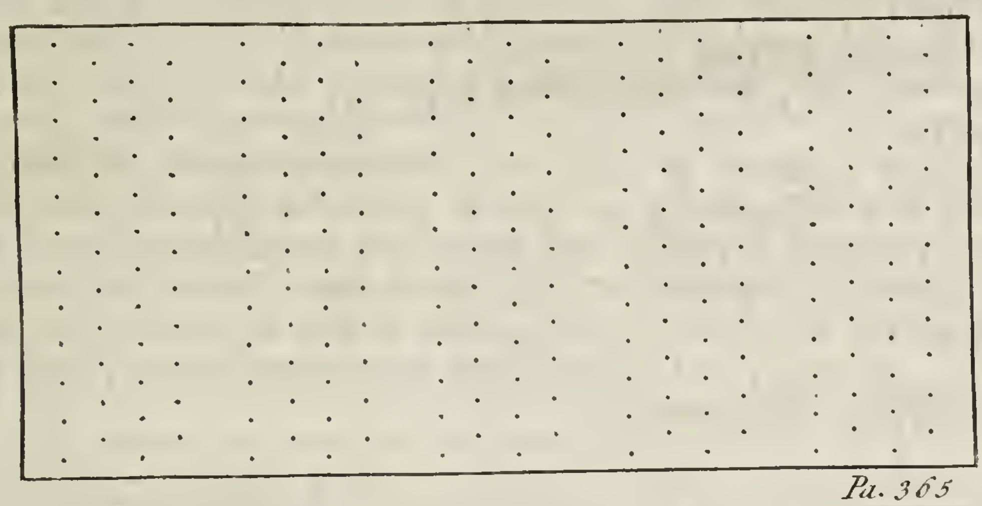
Then ſome Time in *November* or (if that cannot be) in *February*, and not later, ſet four Rows of Plants in each Bed at twelve Inches aſunder in the *Quincunx* Order, allowing two Foot betwixt each Bed for a Path; as may be plainly ſeen and underſtood by the Figure following. But inſtead of making Holes (as the uſual Way is) to put the Plants in, *lay* them only upon the Surface, ſpreading their Roots, as near as may be, at equal Diſtances, and putting a handful of fine Mould upon each to keep them in their Places. This done, lay on ſome of the beſt and fineſt of the *untried Earth* at leaſt three Inches thick, which will *cover* and *plant* them all at once.

Your Bed thus made and planted will riſe three Inches above the natural Surface; but *that three Inches* will ſubſide and be loſt in a Year or two; and therefore *new* Earth of about an Inch deep ſhould be laid on every *Autumn*, together with a Sprinkling of Pidgeon or Hen-dung on the top of the Bed. And this is all the Covering that Aſparagus requires or wants to defend it from the Winter Colds.

I take *November* to be a better Month to plant Aſparagus in, than either *February* or *March*. For no Winter hurts it, if the aforementioned Care be uſed; and then it will be the better diſpoſed to take Root in the Spring, before the dry Weather overtakes it, which often proves fatal to thoſe Beds which are planted late.

N. B. The Aſparagus ſhould not be cut for uſe till the third Year after Planting, and then alſo but *ſparingly*. Its delicious Taſte is mightily heightened by preſerving their Verdure and agreeable Tenderneſs; which is beſt done by letting the Water boil before you put them in.

An Aſparagus Bed eight Yards long and four Yards wide, containing one hundred and twenty Plants in the Quincunx Order.



Thoſe who are curious and covetous to have Aſparagus during the whole Winter Seaſon, muſt ſow and make Plantations every Year for a Succeſſion; becauſe ſuch Plants as are forced in the Hot-Bed ſerve only for that Seaſon, and afterwards die and are caſt away. The Method of raiſing it in that *artificial* Way is this. Make a large Hot-Bed riſing about two Foot high: Cover it with *untried Earth* ſix Inches thick, and limit the Edges with Straw-bands. Upon this plant your Aſparagus Roots, taken from the Nurſery of three or four Years old, as cloſe together as may be, without much regarding to prune their extended Roots. This done, cover the Plants two Inches thick with the ſame Earth, ſtaying a Week before the Frames are put over it; when two Inches more of Earth muſt be laid upon the whole Bed. In about ten Days the Buds will begin to appear; but it is always to be remembered, that the more Air the Seaſon will ſuffer them to have, the *better* and *greener* the Aſparagus will be.

A Bed thus ordered will laſt good four or five Weeks; eſpecially if, as the Bed begins to cool, ſome freſh Horſe Litter from the Stable be laid upon the Glaſſes every Night, which will much contribute to the Forcing the Buds and the Continuance of the Heat. Thoſe who are Lovers of this Article continue this Work from *November* to the latter End of *March*, when the natural Beds begin to diſcover a much better Dainty.

I cannot avoid here taking Notice of and reproving the vulgar Method of cutting the Heads ſo much within the Ground to no good Purpoſe, and yet to the hazzard of wounding the Tops of others juſt beginning to ſprout. All that Part of the Shoot which is within the Ground is of no account; for it is neither *pleaſant* to the Eye nor *grateful* to the Taſte. The beſt Way therefore is to cut none but ſuch as are of a proper Length above the Ground; and then the whole or at leaſt the greateſt Part will prove *tender*, *green* and well *taſted*. The aforementioned common Practice now reproved, together with the Way of loading in ſo much Dung is the Reaſon that the *London Aſparagus* has neither Taſte nor Beauty.

Every Year about *Martlemas* the Stems ſhould be cut down even with the Surface, reſerving the Seed which grows upon the ſtrongeſt: But if Novelty excites a Deſire of taſting them again in Autumn, where there are plenty of Beds, you may cut the Stems down the latter End of *Auguſt*, and about a Month after, eſpecially if Rains come, you will find a ſufficient Quantity putting up to gratify Curioſity. This indeed ſomething weakens the Beds; but where there is plenty, *that* will not be thought an Objection.

Aſparagus requires at leaſt two Dreſſings; one in *November*, and the other in the Beginning of *March*, when the upper Surface ſhould be carefully ſtirred and raked; and what can be ſpared out of the Alleys ſhould be thrown upon the Ridges, the better to cover the Roots, which are apt to riſe upwards. It is common to ſow a Crop of *Onions* on the firſt Years planting; and the Practice cannot be blamed, *Onions* ſtriking little Root down-wards.

CHAP. III.

Of eſculent Roots uſeful in the Kitchen.

UNDER this Head are commonly reckoned the *Carrot*, *Radiſh*, *Parſnip*, *Turnep*, *Beet*, *Scorzonera*, *Horſe Radiſh*, *Potatoes*, *Jeruſalem Artichokes*, *Onion*, *Leek* and *Skirret*.

Carrot. The *Carrot* is of two Sorts, the *yellow* and the *red*; the latter of which is much to be preferred. They both delight in a rich ſandy Soil without Dung, which makes their Roots forked. Thoſe that are deſigned for Winter Uſe and the early part of the Spring, are ſown in *Auguſt*; but the Summer Crop ſhould be ſown in *February:* After the Ground is well dug and prepared, ſow them on the Surface in a ſtill Day; and becauſe the Seed is *light* and *feathered*, the beſt Method is to tread them in all over, and after that gently to rake the Bed, by which means they will lie and grow the more regularly: But they muſt be carefully weeded when they are got into four Leaves.

Radiſh. The *Radiſh* is commonly ſown promiſcuouſly among other Roots in *March*. It likewiſe covets a Sand or light Ground well wrought with the Spade. The earlieſt Crop ſhould lie expoſed to the South; but what are intended for the Summer Months ſhould be ſown under a North-Wall.

Parſnip.

The *Parſnip* affords a large ſweet Root, very pleaſing to ſome and diſpleaſing to others. It is ſown and managed as the Carrot; but is not rightly fit for Uſe till the Froſts have entered the Ground. Radiſhes and Spinage are wont to be ſown amongſt them; becauſe they will be ready to draw before the Parſnips begin to ſpread. And this is eſteem'd a profitable piece of Skill in a Gardener, to underſtand how to double his Crop with ſuch things as will not ſpoil one another. They need not be taken out of the Ground till *Chriſtmaſs*, and then it will be proper to lay them in Sand.

Turnep.

The *Turnep* is eſteemed an excellent wholeſome and uſeful Root. For beſides the Profit which it brings to the Farmer in feeding his Cows and Sheep (of which I ſpeak in another Place) it's an agreeable mixture at the Table, as a *Sauce* for moſt kinds of Meat for the three laſt Months in the Year. There are many Sorts of them, but the two beſt and moſt remarkable are the *long* and the *round* rooted. They are beſt taſted in a ſandy or gravelly Soil. Thoſe which are ſown in the Spring are apt to taſte ſtrong, and are ſeldom tender and white: But when they are ſown in *July* (though they may alſo be ſown till the latter End of *Auguſt*) they will be in Perfection and ready for the Table by *Michaelmas*. They muſt be carefully houghed and ſized at two different times, which the Gardeners about *London* have a dextrous and expeditious Way of doing with an Hough about ſix Inches wide. The Seed ſhould be raiſed from ſome of the beſt and faireſt Roots tranſplanted.

Beet.

Beets are raiſed from Seeds ſown in *March* in a light or ſandy Soil; and to make them *long* and *fair* without being *forked*, they ſhould be tranſplanted into regular Beds at proper Diſtances; but obſerve not to cut off the Tops. Before the Froſts come on, draw them out of the Ground, and under ſome Shelter, bury their roots in Sand to the Neck of the Plant, ranging them one by another ſomewhat ſhelving; from whence they may be drawn for uſe in the Winter as Occaſion ſerves.

Scorzonera.

Scorzonera or *Spaniſh Salſifie* is a very pleaſant Root, not much known till of late Years; of which there are two Sorts, the *Violet* and the *Yellow*, which differ both in Leaf and Flower. They are both equally good and eſteemed very delicious: This Plant has the Preheminence above all other Roots, in that it doth not become ſtringy by lying in the Ground, tho' for ſeveral Years. And yet by their Continuance in the Earth they grow daily bigger, and are fit to eat at all Seaſons, after the brown cruſty Part of the Rind is ſcrap'd off, and are ſoak'd a while in fair Water before they are boiled, to take off that little Bitterneſs, which they would elſe retain. The Seed ſhould be gathered as ſoon as ever the Heads grow downy; otherwiſe the Seed will be apt to be driven away with the Wind. The time of Sowing it is in *April*, in ſome well prepared and deep Soil.

Radiſh.

There are three ſorts of *Radiſhes*. The *Horſe-Radiſh*, which continues many Years and will encreaſe much by tranſplanting the Roots or any pieces thereof at *Michaelmas*. It is a Root *uſeful*, *taſteful* and *wholſome*; and therefore ſhould be particularly taken Care of and encouraged for the uſe of the Kitchen. The ſmall *annual Radiſh* is a Root much valued by moſt for eating raw and mixt with the Sallads. Thoſe who are Admirers of it ſay it is called *Radiſh* or *Radix*, by Way of Eminence or Excellence, *the Root.* The tenderer and ſhorter it is, the better; and therefore thoſe which are raiſed in Hot-Beds are preferred, not only for their *Earlineſs*, but alſo for their better *Reliſh.* By regular and ſucceſſive ſowing, they may be had from *March* to *October*; but hot Weather always makes them eat tough; and therefore are moſt coveted in the Spring. The *black Radiſh* is worth little; but if any admire it, it is to be managed as the ſmall one.

Potatoe. *Potatoes* are generally thought an inſipid Root; but when they are cultivated in a good mixt Soil, they are not without their Admirers: The ſmaller Roots or Knots are commonly preſerved for a ſucceeding Crop, which in *March* are ſet at about eight Inches apart. About *Michaelmas* is the Time when they are firſt begun to be uſed, and they are commonly taken out of the Ground only as Occaſion ſerves during the Winter.

Jeruſalem Artichoke. The *Jeruſalem Artichoke* is a Plant eaſily propagated, and hardly deſtroyed. It has a much larger Root than the *Potatoe*, and is apt to eat watry and inſipid. Is to be managed much as the *Patatoe.*

Onion. *Onions* are almoſt univerſally eſteemed in Sauces: By ſome in leſs, by others in greater Quantities. The two Kinds moſt coveted are the *Spaniſh* and the *Strasburgh* Onion. The *firſt* is large and ſweet-taſted; the *other* is ſtronger and moſt laſting. Both require to be ſown the Middle of *February* in rich Garden Soil, or on an Aſparagus Bed of the firſt Years planting. They are to be firſt thinned for Sallads, and afterwards kept clean from Weeds: And becauſe during the great Heats of the Summer, many of them will be apt to run upward into *Spindle*, if not to *Seed*, the beſt way to prevent that, and to make them bottom well, is either to tread them flat with the Feet, or to flat them diſcreetly with the Back of a Spade. If the Summer prove any thing favourable they will be ripe in *Auguſt*, when they ſhould be pulled up in dry Weather to remain on the Beds to dry throughly before they be houſed, otherwiſe they will quickly rot: After which they ſhould be ſpread thin on the Floor of ſome covered Place, and with this Care many of them will remain good till *April.* The beſt and largeſt ought to be reſerved for Seed to be planted out in *February*; and after they are two Foot high, muſt be ſecured with Sticks from the Fury of the Winds. Let no wet get to the Seed Veſſels after they are cut off, and are laid to dry in the Sun; for the leaſt Moiſture makes them ſprout, and then they are good for nothing. In the Beginning of *Auguſt* a Winter Crop called *Scallions* may be ſown in ſome well ſheltered Place; and theſe will be of uſe, when the others are gone, in the Spring.

Leeks. *Leeks* are ſown in *February* or *March* as the *Onion*, and in *July* are to be tranſplanted in Rows as deep as may be, that you may expect the more of the white Stalk; and ſtill as they grow you are to trench up the Ground to them to augment their *blanching.* Some alſo when they have done graving lay them in the Rill one upon another, leaving only the very Extremities of their Leaves out of the Ground; for what is covered will become white, and ſo the whole Plant becomes both bigger and better. *Garlick* and *Eſcalots*, *Chives* and *Rocamboles*, are eaſily propagated from the Cloves or Offsets in *March*, and will be fit for uſe as ſoon as the Blade turns yellow.

Skirret. The *Skirret*, though an excellent Root, is very much neglected; poſſibly becauſe it is not yet ſo well underſtood. It may be raiſed either from Seed ſown in *March* like other Roots, or the Off-ſets from the Roots may be tranſplanted in that Month. A ſtrong rich Soil much contributes to make the Roots large, eſpecially if they be well watered.

CHAP. IV.

Of Collyflowers, and the ſeveral Kinds of Cabbage.

Colliflower. THE *Colliflower* is univerſally liked and admired as the ſweeteſt and moſt agreeable Sauce to all boiled and roaſted Meats. And if the Plant is managed with Skill, it is a Delicacy may be had from the latter End of *May* till the Severities of the Froſt take place. The Seed of this Plant uſed to be fetched from *France* and *Spain*; but of late Years by Means of Glaſſes and Shelters, we bring the Seed to great Perfection in *England:* But it ſhould be ſaved from ſuch Flowers as were large and white. The earlieſt Flowers in the Spring are obtained from Seed ſown in the Middle of *July*, or the very Beginning of *Auguſt*. At both which Seaſons it is proper to ſow Seed for an early Crop; becauſe a dry, or a very wet Seaſon after Sowing makes a great Alteration with Reſpect to the Plants running or not running to ſeed too ſoon in the Spring. *N. B.* the Seed of two Years old is beſt. About *Michaelmas* they will be fit to tranſplant. And this Remove ſhould be to a well ſheltered Place under a South-Wall, ſetting them four or five Inches apart, with a View of removing the greateſt Part of them into proper Beds in the Spring, when the Danger of the Froſts are over. But it ſhould be well taken Notice of, that under the aforeſaid South-Wall there ſhould be left Plants at about two Foot aſunder, which ſhould ſuffer *no Remove*; becauſe *theſe* will be forwarder by at leaſt a Fortnight, and may be expected to *pome* the latter End of *May*; eſpecially if they have been forwarded by Glaſſes in the early Part of the Spring. But that there may be a proper and regular Succeſſion of thoſe which are raiſed in Autumn, it is a very good Rule, and ought to be taken Notice of, that a provident Gardener will take Care to tranſplant ſome *late* in the Spring under ſome North-Wall, or ſheltered Place, where they may not have too much Sun, and where, by the Help of Water, (of which they are great Lovers) they will prove good, even in the great Heats of Summer, which otherwiſe would make them grow hard, tough, and inſipid. Every one knows when the Bloſſom begins to appear, it is proper to break ſome of the great Leaves to lay over it; becauſe either Rain, or the Heat of the Sun, or both, occaſion the Flower to turn *yellow*.

The Method and Practice of raiſing theſe Plants in the Hot-Bed at Spring ſo well known, excellently anſwers the Deſire of a Succeſſion, and often ſupplies the Loſs of thoſe Plants, which have been deſtroyed by the Severity of the Winter; for if they are raiſed here with Care and Skill, they will produce *almoſt* as early Flowers as thoſe ſown in Autumn. However it is proper to ſow in the Spring, not only in the Hot-Bed, but alſo in the naked Ground upon ſome fine-ſifted *untried Earth* about the Beginning of *April*, for theſe Plants will begin to *pome* by that Time the

Froſts come on; and then ſuch Plants ſhould be taken up with as much Earth as poſſible about their Roots, and ſet upright in Rows together in Sand in ſome Cellar or Green-houſe or other ſheltered Place: And here the Flowers will enlarge themſelves, and be fit for Uſe a great Part of the Winter.

Brocauli. The *Brocauli* is an *Italian* Plant, brought lately from *Rome* by the preſent Earl of *Burlington*, who has given it a Reputation among thoſe who love Novelties, and have *Guſtum Eruditum.* Although it is of the *Cauli* Kind; yet it requires a *particular* Management, and therefore *particular* Directions. Many, ignorant of the Plant, will be ſowing it in the *Spring*; but it ſhould not be ſown till about *Midſummer*, and not much *after* neither; but that it may attain Strength to get over the Winter, which it will pretty well bear, and be fit for the Kitchen in *February*, *March* and *April* following. It is an hardy Plant, and muſt be managed as the *Cabbage*, *Savoy*, or *Colewort.* When it is near its Perfection as before, you'll ſee an Head in the Middle almoſt like a *Colliflower*, which is highly eſteemed, and excellent to eat after it is boiled, as the *Savoy*; but of a much higher, ſweeter, and finer Taſte: But beſides this Method of gathering and eating it, there is alſo another Way of managing and eating it at great Mens Tables: For after the Head is cut off, or that it offers for *Seed* both in the Head and Branches from the Stem, thoſe Sprouts ſhould be cut off at about ſix Inches long, and being ſtripp'd of their Leaves till you come toward the Top, they ſhould be tied in Bunches and ſo boiled like *Aſparagus*; and as you cut the firſt Sprouts, more will ſucceed and put forth, which muſt be ſerved like the firſt. *N. B.* The outer Coat or Skin ſhould be peeled off, and they boil in about four or five Minutes.

Cabbage. There are various Sorts of *Cabbages*, all of them uſeful in the Kitchen. The *white Sort* comes the earlieſt; and therefore is beſt for Summer Uſe; if it be ſown the latter End of *July* and ſtand the Winter, it hath been found to ripen in *May*, and will be very large; inſomuch that the Head of one of theſe planted in a rich loamy Earth, hath weighed above forty Pounds. The *Dutch Cabbage* is very ſweet, and ſoon ripe, and ſo is the *Ruſſia*, which is the leaſt and moſt *humble* of them all; but is hardy and pleaſant Food. The *Savoy*, if ſown in *March*, and not eat till *Chriſtmas* is excellent. But above all there is a *large-ſided* Cabbage, which is in great Eſteem for its Tenderneſs, melting and delicate Taſte: But it will not bear the Severity of Cold, and therefore ſhould not be ſown till the Beginning of *May*; and if it be tranſplanted and well watered in *July*, it will *head* in Autumn, and reward you with a very valuable Sauce; for it is ſpeedily boiled, and even the groſſeſt Part of them melts in your Mouth. It is obſerved that Broth made of them and eaten faſting, will gently looſen the Body, and which is a ſingular Quality attending them, they will never offend you.

The beſt Way is to plant every Sort in Beds by themſelves to diſtinguiſh the Species, ſetting them up to the very Neck in good *untried Earth* at two Foot aſunder in Rows: And I cannot but here repeat the Excellence of *untried Earth* for the Purpoſe of improving the Cabbage; for in all or moſt of the Sorts it takes away that ſtrong Taſte and Smell ſo very offenſive to moſt, and ſubſtitutes a Sweetneſs and Flavour that pleaſes every one. But yet it muſt be owned that the very beſt Sorts are apt to offend the Stomach with *Wind*, and therefore are reckoned by the Learned to be generally *unwholeſome*; eſpecially if eaten in any Quantity. The Seed of ſuch as are intended to ſtand the Winter ſhould be ſoon, as Colliflowers, the Beginning of *Auguſt*, and be managed much after the ſame Manner; only it may be remembered that *theſe* will generally bear more Cold, and are hardier than the Colliflower. It is very proper to hough up the Earth about each Plant in *April* and *May*, which will not only be a Means to clean the Ground, but to make the Cabbages to *head* the better. Be careful alſo to take away all the *dead Leaves*, as well that all may look handſome, as to avoid the ill Scents that proceed from their Corruption, which breeds and invites Snails, Frogs, and Toads, and ſuch like Vermine, which greatly endamage the Plants.

When you *head* a Cabbage it is adviſeable to cut ſlopewiſe, that the Rains may not ſo eaſily penetrate the Stalk to its Deſtruction; for from every Stalk may be expected ſuch green and tender Sprouts, as will be reckoned a Delicacy in the Spring, much preferable even to the Head it ſelf; which the *Italians* call *Brocauly*, and the *French Des Broques*, eaten in *Lent* in *Peaſe-Pottage* and Intermeſſes at the beſt Tables. And indeed for ordinary boiled Sallads, they are then moſt acceptable, being the only Greens, except Spinage which the Cook has Recourſe to.

If you intend to reſerve the Seed let it be of the beſt Sort, and from the faireſt of the Kind. For which Purpoſe after the Cabbage is ſtripp'd of its under Leaves, make an Hole in ſome dry Place in the Garden, wherein plant the Cabbage with half its Head above Ground and half under, moulding up the Earth ſo as to cover the whole. From hence in *March* or *April* the Flower-ſtems will begin to break, and as they encreaſe they muſt be ſtak'd, till the Pods afford you Plenty of Seed in *Auguſt*. Mr. *Evelyn* obſerves, that it is ſcarce an hundred Years ſince Cabbages were firſt brought from *Holland*; and further ſaith, that Sir *Anthony Aſhley* of St. *Giles* in *Dorſetſhire* was the firſt who planted them in *England*. Both theſe and the Colliflower are ſubject to be much infeſted with Variety of Inſects; but yet it is to be obſerved, that the more of the Winter Cold which they ſuſtain, the leſs they are apt to be hurt by Inſects of all the ſeveral Kinds.

CHAP. V.

Of Beans, Peas, Kidney-Beans, and other Pulſe.

BEANS are of ſeveral Sorts. The *Spaniſh Bean* is uſually ſown for an early Crop; becauſe it endures the Winter Colds; but it is by no Means ſo good and well taſted as the common *broad Bean*. The firſt ſowing is uſually about the Middle of *November* in ſome Place well ſheltered from the Winds; for it matters not whether they have much of the Sun or not; the uncertain Alterations of thawing and freezing, which they commonly undergo under a hot Wall, rather tending to their Deſtruction. Tall Hedges, or Trees at a Diſtance on the Eaſt, North, and Weſt are the beſt and moſt approved Defence. But yet after all a hard Winter often proves their Ruine. And it is remarkable that although *Beans.*

though you ſet *Beans* the Beginning of *November*, and they happen to ſtand the Winter, and ſet again the ſame Sort at *Candlemas*, which is three Months Difference in Time, there will *ordinarily* be found to be no more than a Week or ten Days Difference in the Time of *ripening*. So that the Spring-Crop being what is to be depended on, and coming not much later than the other, the chief Care of the Gardener is to have a ſufficient Quantity, and gradual Crops of theſe of the large broad Kind: And he will have his Expectations well anſwered as to Forwardneſs and Plenty; if eſpecially he take Care to ſteep the Seeds a Day or two in Water taken from a Dunghill. For this hath been found to make them flowriſh exceedingly, and much advanceth their Growth and Time of ripening: Beſides, they'll not remain ſo long in the Earth before they come up, and ſo the Danger of being eaten by Worms, Inſects, and Mice is leſſened, if not prevented.

They are uſually ſown after the Hough or with a Stick in Lines two Rows together, with the Diſtance of two Foot betwixt every ſuch double Row; and Care ſhould be taken to hough the Earth well up to their Roots before they bloſſom, which will greatly help their *ſetting* for Fruit. If it ſhould happen ſo that the ſeveral Crops of Beans bloſſom too near the ſame Time, it would be very adviſeable to cut down one of them within two Inches of the Ground, and will have a late and plentiful Crop in *September*. In gathering green Beans for the Table, they ſhould not be ſtripp'd, as is uſual, with the *Hand*, but rather cut off with a *Knife* to prevent great Damage often done to the Stalk.

Although the Aſhes of the Bean-ſtalks burnt are greatly deſired by the good Houſewives; yet it is more deſirable to have the Haum dug in amongſt the Soil; for after it is rotted there, it will greatly improve it. Or if you would learn the Art of making Land improve it ſelf (which is an Art may be learnt in the Field and Garden too) ſow Beans without any View of gathering their Fruit, and when they are in full Bloſſom, dig them in altogether, Earth and Beans, without accounting it any Loſs; for this Practice will improve your Land beyond Imagination, and doubly repay your Loſs.

Peaſe. The ſeveral Sorts of *Peaſe* are vaſtly many, and they all require a leſs heavy or ſtiff Soil than Beans; for they will do well either in ſandy or gravelly Land, provided it be not extremely poor. There is an early Hot-ſpur called the *Henley Gray*, which is uſually ſown the Beginning of *November*; being very hardy and will endure moſt Winters under a good Defence; but the Pea it ſelf is worth nothing, but that it comes early. The *white Hot-ſpur*, or Nine-weeks Pea, (ſo called, becauſe if ſown on *May-Day* it will be fit to eat in nine Weeks, ſome ſay in ſix after) is the very beſt of the *Hot-ſpurs*, having many good Qualities; is pretty hardy, an excellent Bearer, comes early, and boils very green and ſweet. The *Dwarf white Pea* is proper to be ſown in windy and expoſed Places, being a Reptile. The *Dutch Admiral*, and the *Marrow Pea*, which are moſt excellent, ſhould not be ſown till *March* or *April*; but they require to be well ſupported, as affecting a Superiority; and then they reward the Owner with Plenty. Theſe *laſt* ſhould be ſown much *thinner* than the reſt, and the Diſtance of one Row from another *wider*. Four Foot Diſtance ſhould be allowed for theſe, and two or three for the other Sorts, taking Care frequently to hough the Alleys, and to cheriſh the Roots with new Earth. Some ſow two Rows together, and then leave a Diſtance of between two and three Foot for Alleys, ſtill keeping ſowing for a Succeſſion of Crops till *Midſummer*, that ſo uſeful and acceptable a Diſh may not be wanted at the Table, even in the Beginning of *October*.

Peaſe are generally eſteemed the *ſweeteſt* and *moſt pleaſant* of all Legums or Pulſes; tho' eaten in Quantities they are not accounted the *moſt wholeſome* Food, cauſing Wind in the Bowels and great Eructations; but more in ſome Conſtitutions than in others. The common Sorts have been long acquainted with our *Engliſh* Air and Soil. But of late almoſt every Year we have new Sorts, ſuppoſed to be ſweeter and more delicate, introduced into our Gardens; but whether they are really better or their Reception be chiefly owing to a Love of Novelty, I will not pretend to ſay. We are told of no leſs than five Sorts of Rouncivals *the grey*, the *white*, the *blue*, the *green* and the *maple*: Three Sorts of Sugar-Peaſe, the *large white* and the *ſmall white*, and *the grey*: And we have the *Egg Pea*, the *Wing Pea*, and the *Sickle Pea*. But I ſhall not promiſe that many of theſe with different Names are not the ſame. However it is plain from Experience, that moſt of theſe new Sorts of late introduced amongſt us are tenderer than the Hotſpurs, and therefore ſhould not be ſown till *March* or *April*.

Ground laid in deep Furrows running from Eaſt to Weſt, and Peaſe ſown on the declining Part of each Furrow facing the South will defend them from the Winds and Froſts in Winter, better than if they were ſown on a Level. And it may not be amiſs alſo to add here, that Peaſe by the Help of their Tendrils climbing on Sticks will bear *more*; but lying on the Ground will ripen *ſooner*. So alſo a light Soil, if it be rich, will produce *fairer* Peaſe; but in a lean Soil, the Peaſe will be *more early* and ſpend better; eſpecially ſuch as are uſed when dry.

Altho' *Kidney-Beans* is an antient Food, and was held in great Eſteem amongſt the old *Italians*; yet it is not a Century ſince it was accounted an extraordinary Rarity in *England*. It is now indeed a known and much admired Food, either eaten by itſelf, or as a boiled Sallad to all Sorts of Meat, both boiled or roaſted; laſting in Seaſon from the Beginning of *July* till after *Michaelmas*; and it comes in ſooner ſtill, if forwarded by Hot-Beds, as the Method about *London* is. *Kidney-beans.*

There are reckoned to be above fifty Sorts of *Harricots* or Kidney-Beans; but the two moſt remarkable and approved Sorts are the *Dwarf-kind* or *Batterſea* Bean, which never runs high, and will do well without Staking; and another *white Kind*, which will grow near ſix Foot high by the help of Sticks; for all the Sorts of them are Convolvulus's, but in their twiſting turn *contrary* to the Sun, or as a Screw inverted, whereas *Corn bind*, Hops, *&c.* turn *with* the Sun, or as a Screw in its natural Poſture for Uſe.

Eagerneſs to have this delicacy early tempts many to ſow them in the Beginning of *April:* But yet it is to very little Purpoſe to ſow before the Beginning of *May*, becauſe thoſe ſown a Month ſooner will not have above two Days Advantage in their ripening; and then they are ſubject to great Hazzards of Wet and Froſt. They delight in a warm light Soil, and ſhould be ſowed like Peaſe in Drills and at the ſame Diſtance. It is with theſe as with the ſeveral Sorts of Peaſe, if ſupported by Sticks they will bear *more* and *longer*; but if ſuffered to lie on the Ground (the Alleys kept clean) they will bear *ſooner*. It is very proper to have a Succeſſion of Crops, and to ſow *ſome* every three Weeks till the Middle of *July*; only it ſhould be remembered, that in the very hot Seaſon, that the Drills, when opened, ſhould be well watered before the Seed is put in, the better to make them ſprout and take Root: For tho' they are impatient of too much Wet; yet neither will they grow, if they lie altogether dry.

The *painted* or *ſtreak'd* Bean is of all others the hardeſt and ſooneſt ripe, by at leaſt ten Days; and tho' ſome think it is not ſo good, yet I could never diſcern much Difference, having nothing but a ſweet and pleaſant Reliſh. The *Scarlet* Sort indeed eats ſomething ſtrong, tho' uſed in Pickles is incomparably the beſt, tendereſt and greeneſt; and if boiled in two Waters, eats very ſweet in the common Way. There is a very large and long Podded white Bean, which yet is no otherways better than the *ſmall white* one (which is by all eſteemed to be tender, ſweet, and delicate) than as it is larger.

We are told of another good Sort brought from the Iſland *Bona Viſta*, which are by ſome eſteemed excellent eaten *dry*. Our Summers do not in the natural Way bring them to Perfection; but doubtleſs if they were raiſed in an Hot-Bed, they would come to Maturity, and might be eaten in Perfection in the green Shell. There is alſo what is called the *Wing Pea*, which when is very young is dreſſed and eaten like the Kidney-Bean. The Bloſſoms are of a beautiful Colour and make a goodly Shew in a Garden; for they grow in any Soil without Difficulty, if they be ſown in *April*.

CHAP. VI.

Of ſuch Herbs and Plants as are commonly uſed in Sallads, with the beſt Methods of Cultivating and Mixing them.

BEſides the great Variety of Legums and eſculent Plants, which we have already named, the greateſt Part whereof may be eaten by themſelves; there are likewiſe many excellent Herbs and uſeful Plants, exceedingly grateful to the Palates of ſuch as can reliſh the Beauty and wholeſome Diet of *Sallads* mixt with Diſcretion and Art.

Mr. *Evelyn* hath wrote a ſmall Tract called *Acetaria*; wherein he hath with a great deal of Learning and Skill deſcribed the ſeveral Virtues of Sallad Herbs, their Uſefulneſs and Salubrity to Mankind, when rightly choſen, ordered, and dreſſed; I ſhall therefore without any Difficulty take from thence what is to my preſent Purpoſe, and what hath been found by Experience to be right and true; deſiring the Reader to have a little Patience, whilſt upon this Occaſion I ſay ſomething of the great Bleſſing of Health and long Life, that would attend Mankind, if the Uſe of Sallads were made more our ordinary and familiar Food; and not brought to the Table only for Shew, or by Way of Introduction to the Luxury of various Meats and Fleſh, ſtudiouſly heightned to the Taſte by artificial and unwholeſome Sauces, to the Ruin of Mens Conſtitutions, and the faſtening upon them all Sorts of ſcorbutick and lingering Diſeaſes: For theſe are known to debauch the Stomach and ſharpen it to devour things of difficult Concoction with thoſe of more eaſie Digeſtion, and of contrary Subſtances, more than it can well diſpoſe of. For the Obſervation of the Naturaliſt is moſt certainly true, *Hominis Cibus utiliſſimus Simplex*; *Plin. Nat. Hiſt.* which is alſo confirmed by what we find as to other Animals, which are ſo ſeldom afflicted with Mens Diſtempers derived from the Cauſes above mentioned. For the Stomach eaſily concocts plain ſimple Food, but finds it hard to overcome Meats of different Subſtances; whence we ſo often obſerve temperate Perſons of a regular Diet very healthy; ſuch as the laborious Husbandman, who is ordinarily more robuſt and longer lived than others of an uncertain extravagant Diet. So true was *Oſellus*'s Memorandum in the Poet. *Hor. Sat.* l. ii.

—— —— —— —— —— variæ Res
Vt noceant homini, credas, memor illius Eſcæ
Quæ ſimplex olim tibi ſederit. —— ——

To the Purpoſe of what we are now ſpeaking, it may be obſerved, that our bountiful and loving God, when he particularly ordained Herbs and Fruit for the Food of Men, ſpeaks not one word concerning Fleſh *Gen.* 9. for about one Thouſand ſix Hundred Years till after the Flood. And when the Moſaic Law afterwards made Diſtinctions and Prohibitions about the *legal* Impurity or Uncleanneſs of Animals, it is very obſervable alſo that *Plants*, *Fruits* and *Herbs* of what Kind ſoever were left free and indifferent for every one to chuſe what he liked beſt. As if it was thought unbecoming the Dignity of Man's Nature, before Sin entered or grew enormouſly prevalent, that any Creature ſhould be put to Death to ſuſtain that Life, which might have been upheld by the moſt delicious Herbs and Fruit, even in Paradiſe itſelf.

Many of the Fathers themſelves were tempted to think, that the *Tert.* Permiſſion of eating Fleſh to *Noah* and his Sons, was granted them no *Jerom* &c. otherwiſe than *Repudiation* of Wives was to the *Jews*, *viz. for the Hardneſs of their Hearts*, and to ſatisfy a murmuring Generation. But what ſaith *Seneca*. This ſhould ſeem no hard Task to refrain from *Epiſt.* 108. eating Fleſh, if Men abhor'd (as they ought) Cruelty and Intemperance: For Herbs and Sallads are phyſical and natural Advancers of Health and other Bleſſings: And therefore Abſtinence from Fleſh deprives Men of nothing but what Lyons, Vultures, Beaſts and Birds of Prey ſatiate and gorge themſelves withal. That whole Epiſtle of Seneca's is very fine and elegant; ſhewing how many ſlaviſh hurtful and impertinent Cuſtoms he had freed himſelf from with Pleaſure and Satisfaction to his own Mind. Let this be apply'd not only to *Sarkofagiſts*; but alſo to the exceſſive Drinkers of foreign Spirits and hot Liquors!

In what I have here advanced, I am far from thinking Conſcience any otherwiſe concerned than to preſerve Moderation and Temperance. There is no ſuch thing under the Goſpel as the Diſtinction of Meats *pure* and *impure*, though Reaſon ſhould teach us to have ſome Regard to the cruel Butcheries of many harmleſs Creatures too often put to rack and mercileſs Torment to gratifie the wanton and vitiated Palates of extravagant Epicures. What I would be underſtood to mean, and to lay ſome

Streſs upon, being led by Reaſon and the Authority of wiſe and good Men, is, that if Perſons would ſtudy to live long and happily, they ſhould live *leſs* on Fleſh, and *more* on wholeſome Vegetables. I ſay nothing *here* of *Blood.*

There are indeed two Objections that lie againſt this Doctrine here advanced: *Firſt*, That there are few Conſtitutions could be either long or happily ſupported by ſo crude and lean a Diet. To which it may be ſufficient to anſwer, that that Objection chiefly bears upon too ſudden and indiſcreet a Change of Diet, or too unskilful a Mixture and Preparation of Herbs and Sallads: (of which laſt more anon.) Indeed when Perſons from their Infancy are innured to Graſs-Diet, and trained up to feed on the Fleſh of Beaſts, Birds, or Fiſhes, it may be difficult, if not dangerous, to make a ſudden Change in the Middle or the latter End of Life, to live *wholly* on Vegetables: But I doubt not in the leaſt, but that in any Part of Life a diſcreet Change and Choice would remove the Objection and eſtabliſh the Doctrine of *Longævity*, from the more frequent Uſe of Herbs, Fruits, and Plants. *Secondly*, It is alſo objected again, That all or moſt of Vegetables (as well as many other Things) have ſince the Flood, and as the World grew older, grown more crude, more impaired, and deveſted of thoſe nouriſhing Virtues, wherewith they were at firſt endued; and which, according to the Opinion of many, was the Cauſe of the *Longævity* of the *Antediluvian* Patriarchs. To which I anſwer, that I have nothing to ſay againſt the Doctrine of *Longævity* from the Uſe of Herbs, Plants and Fruit; but that *theſe* have loſt any of their original Virtues, much leſs that from being the moſt wholeſome Diet, are now become noxious or dangerous, this is *begging the Queſtion.* On the contrary, it is more than probable from the preſent Conſtitution of Nature, the Order of Things both without and within us, the Laws of God to encourage Temperance, and his ſevere Threatnings to puniſh Exceſs and Intemperance, that there is not the leaſt Decay in Nature, where equal Induſtry and equal Skill is apply'd. The moſt learned Dr. *Sherlock* in his ingenious and polite Sermons bids fair to have made it probable, that the Flood better'd and not ſpoil'd the Earth, to have repealed and not executed the Curſe on *Adam.*

Our learned and excellent Botaniſt Mr. *Ray*, is tranſported in deſcribing the Virtues and Excellencies of Vegetables for Man's Uſe. *Plantarum uſus latiſſimè patet, &c.* " The Uſe of Herbs and Plants (ſaith he) " is in every Part of Life of ſuch Importance, that we cannot be ſaid " without them to ſubſiſt either plentifully or handſomely, or indeed to " live at all as we ought to live. Whatſoever Food is neceſſary for Life, " whatſoever contributes to our Delight, is brought out of that plentiful " Store. And then how much more innocent, elegant and healthful is " a Table covered with theſe, than with the Butchery and Slaughter of " Animals? Doubtleſs Man by his Nature is not a *carnivorous* Creature, " nor is he furniſhed with Weapons for Rapine and Prey, with pointed " Teeth and crooked Claws; but with *Hands* to gather Fruits, and *Teeth* " to chew them. Neither do we read that Fleſh for Food was permitted " him at all before the Flood, *&c.*

Indeed the ſurprizing Goodneſs of the wiſe Author of Nature is diſcovered in the various Natures and different Properties of Plants; on Purpoſe to exerciſe the Skill of Man in *mixing*, and his Delight in *taſting* the Elegancies of Garden Products. A gentle *Heat* in ſome to warm and cheriſh; *Coolneſs* in others to temper and refreſh; an oily *Juice* to nouriſh and feed the Body; Poinant *Acids* to quicken the Appetite, and all to court the Obedience of the Palate; to renew and ſupport our natural Strength; to delight and recreate us with their harmleſs Flavour and Perfumes. In ſhort, the infinite Variety and Plenty, with which God hath ſtored this Globe (more with Plants and Vegetables than with any other Proviſion whatſoever) ſeems kindly and loudly to invite all her living Inhabitants, not of *ſavage* but of *gentle* Nature, to come and partake of her delicate and hoſpitable Fare. Accordingly we read of ſome of the greateſt Princes that took the Spade and the Plough-ſtaff in the ſame Hand they held the Sceptre, and the nobleſt † Families thought it no Diſhonour to derive their Names from Plants and Sallad Herbs. However, to ſhew how the beſt and moſt innocent Things may be perverted, they changed thoſe frugal harmleſs Feaſts of their Anceſtors into Prodigality and Waſte; inſomuch that we read of Edicts and Laws enacted *Cic. Ep.* lib. 7. to reſtrain even the Pride and Luxury of Sallads; and all that was but *green* was ſo much engroſſed, that *Pliny* tells us (merrily I ſuppoſe) a poor Man could hardly find a *Thiſtle* to dreſs for his Supper, or nothing *Plin. Nat. Hiſt* lib. 19. but what his hungry Aſs would not touch for Fear of pricking his Lips.

But by Way of Caution I again add, I would not be underſtood, as if becauſe Sallads are innocent and wholeſome Food, that therefore Men ſhould be turned to *Graſs* again, and be adviſed to neglect the Bounty of Heaven, as well as forget their own Health and Comfort; I would only be thought a little (by former Practices and Examples) to reproach the Effeminacy and Luxury of the preſent Age, and at the ſame Time paint the Beauty and the Bleſſing of Temperance, and the vertuous Conſequences thereof; ſhewing at the ſame Time that Nature is ſatisfied with a little; and that if Appetite or a *benè moratus venter* be kept within the Bounds of a moderate and inartificial Diet, the Remains of Fortune may be with Pleaſure reſerved to the nobler Parts of Life.

Having thus far in general prepared my Way by ſhewing the Uſefulneſs of Sallad Herbs and their Salubrity to Mankind, I ſhall proceed to deſcribe their particular Natures and Uſe, with the apteſt Methods of raiſing and cultivating them. In Order to which I ſhall begin with

Lettuce. The *Lettuce*, of which there are great Varieties; and thoſe are generally moſt eſteemed which *head* like a Cabbage, hard and round. There are many of late Years have affected to introduce ſeveral new Kinds: But there are only three or four Sorts, that any one need deſire to cultivate, *viz.* The *Imperial*, the *Sileſia*, the *Roman*, and the *Dutch brown* Lettuce. The *Imperial* and *Sileſia* Lettuce, if they be ſown in *Auguſt*, and in *October*, tranſplanted under ſome warm Shelter, will be very large, and fit to cut early in the Spring, for they endure the Winter pretty well; or if they be ſown in the Spring, they will be fit to cut by Midſummer. The *Dutch brown* Lettuce is by many admired for its early cabbaging in the Spring; for it will alſo ſtand the Winter; but the *Roman* Lettuce, tho' a very good one, expects to be more tenderly treated, and to have the Advantage of the Summer; for it is impatient of the Froſts. *Lettuce* being the moſt precious Ingredient in a Sallad, or rather by ſome thought a Sallad by itſelf, the Admirers of it (eaten either before or after it cabbages) continue a Succeſſion, by ſowing it all the Summer Months.

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† Valeriana, Lactucinii, Achilleia, Lyſimachia; Fabius, Cicero, Lentulus, Piſo, *&c.* à Fabis, Cicere, Lente, Piſis bene ſerendis dicti. Plin. *Nat. Hiſt.*

Such of the ſeveral Sorts as produce the largeſt Heads in the Spring ſhould be ſuffered to run for *Seed*; and for that Purpoſe ſhould be *ſtak'd* leſt the Winds throw them down, or too much weaken them at the Roots. The Seeds are fit to gather as ſoon as they begin to ſhew their *Down*, when the whole Plant ſhould be ſet under Cover to dry, till you find the Seed is fit to be thraſhed out.

N. B. The beſt Seed and Kinds will degenerate in two or three Years if they are continued to be planted in the ſame Garden; and therefore the beſt Way once in two Years, is to make a Change with ſome of your Neighbours that have a different Soil.

Lettuce is ſuppoſed to have a *Somniferous* Quality eaten by itſelf in any Quantity. And *Hypocrates* acknowledges that thoſe of his Countrey were there poiſonous, tho' with us who have leſs Sun, the Efficacy of its Juice is laver'd and weakened into Wholeſomeneſs and made agreeable. It ever was and ſtill continues the Principal of the whole Tribe of Sallads, having beſides its other Properties a cool and refreſhing Nature. It was in ſuch high Eſteem among the Antients that diverſe of the Valerian Family (as before was hinted) thought fit to dignifie and diſtinguiſh their Names with that of *Lactucinii*.

Mr. *Evelyn* ſaith, that tho' it is of a Nature colder and moiſter than ſome other Herbs; yet it is leſs aſtringent, and ſo harmleſs, that it may be ſafely eaten raw in Fevers; for it allays Heats, extinguiſhes Thirſt, excites Apetite, kindly nouriſhes; and above all repreſſes Vapours, and promotes Sleep. Accordingly the excellent Emperor *Tacitus*, ſo famous for his Frugalities, was yet wont to ſay of *Lettuce*, when he eat it, that he did *Somnum ſe mercari*. In ſhort we meet with nothing amongſt all the crude Materials for Sallading, either ſo proper to mix with others, or ſo wholeſome to be eaten alone; always ſuppoſing to be added the uſual *Oxolæum* of Vinegar, Oil, and Pepper.

Endive. *Endive* when it is blanched is much uſed in Winter Sallads, and the *curled* Sort is at preſent moſt in Vogue; but the largeſt, whiteſt, and tendereſt Leaves are thought beſt when they are boiled. But I am of Mr. *Bradley*'s Mind, that it is hardly worth while to plant it, having little Taſte or Flavour. But as it has its Admirers, they are adviſed to ſow the Seeds the latter End of *April* in a light rich Soil, and about *July* plant it deep in Rows about ſix Inches aſunder; and as it grows, tie up ſome Plants one after another, to whiten for Uſe.

Purſlain. *Purſlain* is another inſipid Herb; but being very *cooling* is much admired by ſome, and generally entertained in all Sallads mingled with hotter Herbs; tho' ſome learned Phyſicians have accuſed it of being apt to corrupt in the Stomach, and of being hurtful to the Teeth. There are two Sorts of it, the *green* and the *golden*; the *laſt* is moſt tender. They are both raiſed from a ſmall black Seed ſown in ſome warm Place in *April*, and will be made better and earlier by the Help of Glaſſes.

Sellery. *Sellery* when it is well blanched, and ſet in a Place and Soil proper for it, is one of the moſt generally approved Winter Sallads, it being of a hot Nature and moſt prevailing rich Flavour. It is a generous Sort of *Macedonian Parſley*, and hath not been long from *Italy* introduced a-amongſt us: But now it moſt deſervedly obtains a Place not only in raw Sallads, but alſo in Soops and Pottages: For its high and grateful Taſte, it always makes an uſeful and an acceptable Appearance; and never is more graceful, than when it erects it ſelf in the Middle of the *grand Sallad* at *Prætor*'s Feaſts, and great Mens Tables. The Seed is to be ſown in *March*, and (to have it early) in a Hot-Bed too. About ſix Weeks after, the Plants are to be removed in Beds of rich Earth, four Inches aſunder; where they are to be well watered to make them tender and white, after they are well *blanched*, for therein conſiſts their Goodneſs. But for the better Purpoſe of *blanching* them, it is to be remembered, that they are to be ſet in *Trenches*, that the Earth may readier cloſe upon them, and keep them moiſt; and moreover that each Plant be tied with Bands before they are earth'd up. *Sellery*, thus ordered and earth'd up to the Top of its Leaves, whitens in three Weeks or a Month. But when it is once whitened it rots as it ſtands; and for that Reaſon it is not to be earth'd or covered with Dung, but in ſuch Proportion as ſuits the preſent Occaſion. The ſevere Froſts ſpoil the Sellery, and therefore Care ſhould be had to cover or ſkreen them. It may be neceſſary to give a Caution of a ſmall red Worm, which often lurks in the Stalks, that it may be removed.

Fennel, but eſpecially the *Italian* Sort, is a very neceſſary Plant in a Garden; and, if it be managed as *Sellery*, is an uſeful and very much admired Article in a Sallad. The common Sort may be made pretty good with blanching, but not comparable to the *Italian*, which hath been but of late Years introduced amongſt us. It ſhould not be ſown 'till the latter End of *April*, or the Beginning of *May*, leſt it run to Seed, and the Plant become hard and ſtubborn; for after it is blanched as *Sellery*, the youngeſt and tendereſt Shoots of it are the beſt; which will eat ſweet and delicate, having the uſual Sauce of Oil, Salt, and Vinegar: For it is aromatick, hot, and dry; wherefore it expels Wind, and recreates the Brain. The *Italians* eat the blanch'd Stalk peel'd when young, which they call *Cartucci*, all Winter long, being an hardy Plant, and not eaſily ſpoil'd with the Froſt. There is a ſmall *green* Worm which ſometimes lodges in the Stem of this Plant, as the *red one* doth in Sellery. *Fennel.*

I have been informed, that the Honourable Sir *Spencer Compton*, preſent Speaker of the Houſe of Commons, as well as my Lord *Burlington*, have at *Chiſwick* arrived to great Perfection in the Cultivation of this Plant, which is called by the *Italians* the *Fenocuo*; for by dextrous Removes into very rich Soils, they can in one Summer ſwell the Plant to be larger than ones Arm, and mellow its Taſte into a ſpicy Sweetneſs, ſurpaſſing even the Flavour of *Sellery*, and have vaſt Quantities ſucceeding each other thro' the whole Year. My Friend Mr. *Parker* tells me they ſow it in a Drill three Inches deep as thin as poſſible; and when the Plants are reaſonably ſtrong, they ſingle them to a Foot Diſtance, diſpoſing thoſe which are removed in the ſame Order in the richeſt Earth that can be made. In dry Weather they draw as much Earth to the Plants, as Neceſſity and Occaſion require, in the Method you do *Sellery*; obſerving that the *larger* and *whiter* it is, the better and higher taſted: But it is to be remembered alſo, that thoſe Plants which are blanched in the Place where they were ſown, without a Remove, are always better and bigger than thoſe which are tranſplanted, which is a Reaſon for its being ſown thin.

Sorrel. *Sorrel*, of which there are diverſe Kinds; but that called the *French Sorrel* with a round Leaf now generally prevails. It is by Nature cold, abſterſive, and acid; and therefore ſharpens the Appetite, aſſwages Heat, and ſtrengthens the Heart. It is a great *Antiſcorbutic*, and being mixt with ſome of the foregoing, imparts a grateful Acidity and Quickneſs to the reſt; ſuch as ſupplies the Want of Orange or Lemon; and for that Reaſon ſhould never be excluded from the Sallad. It will grow almoſt in any Soil, and the round Sort is beſt multiplied by running Branches, which will eaſily take Root in the Earth, and ſo being removed in *May*, will grow in Tufts.

Spinage. There are but two Sorts of *Spinage*, properly ſo called; the Seed of one is *round*, the other *prickly*; but as to the Plant there is little or no Difference with Reſpect to Shape or Taſte, eaten either boiled or raw. If it is eaten as a Sallad with other Herbs, it muſt be gathered whilſt it is very young, and then, though it is ſomething *inſipid*, yet it is *tender*. But doubtleſs the beſt Way of eating *Spinage* is to boil it with no other Water but its own Moiſture; and then it becomes better reliſhed, and an admirable Sauce for all Sorts of boiled Fleſh. 'Tis *laxative* and *emollient*, therefore good for the aged; and ſo inoffenſive, that a ſick Man may eat it. The Plant by Original is a *Spaniard*; but it is now well naturalized, and may be raiſed in almoſt all Parts of the Year. It loves a rich Soil and deſerves it; for if it is ſown in the Beginning of *Auguſt* in a Place ſheltered and well expoſed to the Sun, it will be fit for Uſe almoſt all the Winter. And then what is ſown in the Spring, *February*, *March*, *April*, and *May* will anſwer, by a conſtant Succeſſion, the Uſes of the Kitchen.

Cherville. The *Muſk*, or *Spaniſh Aromatic Cherville* is a mighty uſeful Plant in Sallads, where the tender Tops are never to be wanting, as long as they may be had; being exceedingly wholeſome and chearing the Spirits. Phyſicians commend boiling their Roots and their being eaten cold, for aged Perſons. It is multiplied only by Seed, which is longiſh and black. There is an ordinary Sort which is an Annual, and ſhould be ſown monthly for the Sake of their tender Leaves; but the ſweet *Cherville* will remain many Years without being ſpoiled by the Froſt.

Creſſes. The *Garden Creſſes* ſhould be ſown monthly; becauſe they laſt good and tender but a little while, and being ſown very thick a ſufficient Quantity with a Knife is ſoon gathered, even when it is not more than half an Inch above Ground; but when it is deſired for early Sallads, Recourſe muſt be had to the Hot-Bed, where you may have it almoſt all the Year. It bears Seed plentifully, and of a Colour different from moſt others, being *red*. But the *Indian Creſs*, *Naſturtium Indicum*, is what is now moſt coveted in Sallads; for not only their Leaves, but Capuchin Capers and Flowers are very agreeably mixed with colder Plants. This is called by ſome the *yellow Larkſpur* from the Colour and Shape of its Flower. If they are ſown in *April* they will grow very well in ordinary Garden Mould, and will increaſe wonderfully both in Stalk and Flower. The Seeds of this Plant may be made uſe of for Muſtard; for being well dried and beaten to a fine Powder, and afterwards mixt with Onion and Vinegar it yields a quick Pungency, and anſwers the Purpoſes of good Muſtard. The Leaves, Flowers, and Seeds of this Plant are moderately hot and aromatick, do greatly revive the Spirits, and add a very agreeable Flavour mixt with other Herbs; but above all, are of ſingular Effect againſt the Scurvy. There is alſo the *Naſturtium Hybernicum* commended much by ſome; and every one knows the Uſe and Excellence of the common *Water-Creſs*, which is wont to grow at the Head of Springs. They are all of the ſame Nature, though of different Degrees; are beſt for raw and cold Stomachs, though they are ſuppoſed to afford but little Nouriſhment.

Garlick. *Garlick*, which by Reaſon of its ſtrong Smell and Rankneſs, is often baniſhed the Sallad, is yet both by *Spaniards* and *Italians* and the more Southern People familiarly eaten almoſt with every thing, and eſteemed of ſuch ſingular Virtue to help Concoction, that 'tis thought a Charm againſt all Poiſon and Infection; called from thence the Countreyman's *Theriacle*. It may be proper enough for ſuch Ruſticks as live in Marſhes and Fenns; but to be ſure 'tis not for nice Palates, further than to permit a gentle Rub on the Plate with one of the Cloves; which yet moſt think better ſupply'd by the milder *Rocombole*. If it is boiled as they ſometimes eat it in *Spain*, its Rancour is tamed, and it becomes *nouriſhing* rather than *medicinal*. But

Onion, Leek, &c. The *Onion*, *Leek*, and *Cives* are without much Difficulty admitted into the Sallad, being not near ſo hot and rank as *Garlick*; eſpecially the Tops eaten young and tender. In *Italy* they frequently make a Sallad of *theſe* only, ſeaſoned with Oil and Pepper: And a laborious Countreyman with *Bread* and *Salt* and a little *Parſley* will make a contented Meal with a roaſted *Onion*. The *Onion* is indeed beſt eaten boiled in two or three Waters, giving *then* a kind and mild Reliſh, raiſing Appetite and ſtrengthening the Stomach; but they are ſuppoſed to offend the Eyes and Head, if they are eaten in Exceſs. How this uſeful Bulb was deified in *Egypt* we are told in *Juvenal*†; and *Herodotus* talks of vaſt Sums of Money ſpent in this Root diſtributed amongſt the Workmen whilſt they were building the Pyramids. And ſurely it muſt be a longing Degree of Love for this Plant, that the *Iſraelites* ſhould grow uneaſy under a Theocraſy and View of a promiſed Land flowing with Milk and Honey, wiſhing to return to Bondage and Slavery, only led with Hopes of enjoying again their beloved *Leeks* and *Onions* and *Garlick* of *Egypt*.

Capſicum Indicum. *Capſicum Indicum*, or *Indian Pepper*, is ſuperlatively hot and burning; and yet by the *Africans* is eaten with Salt and Vinegar by it ſelf. But although ſuch Experiments may be dangerous here; yet its terribly-biting Quality may by Art and Mixture be rendered not only *ſafe*, but very *agreeable* in Sallads. Mr. *Evelyn* adviſes to take the ſcarlet Pods, and dry them well in a Pan, and when they are become ſufficiently hard, cut them into ſmall Pieces, and ſtamp them in a Mortar to Duſt. To each Ounce whereof put a Pound of Wheat Flower, fermented with a little Leaven. Knead, or make them into Cakes or Loaves cut longwiſe in the Shape of Naples Biskets: Theſe *rebake* a ſecond Time, 'till they are Stone-hard; pound them again as before, and ſearce it through a fine Sieve. Thus prepared, it becomes a proper ſeaſoning inſtead of vulgar Pepper.

Sage. *Sage* is of a hot and dry Nature, excellent for the Head, Memory, and Eyes, and in all paralitical Caſes. There are three or four Sorts; the *red*, the *green*, and *Tea-Sage*; and another of a *Wormwood* Flavour.

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* O Sanctas gentes, quibus hæc naſcuntur in hortis
Numina! ——— ——————— Juv. Sat. 15.

They are all raiſed of Slips taken from the Root the latter End of *April*, or the Beginning of *May*. 'Tis a Plant endued with ſo many wholeſome Properties, that the conſtant Uſe of it is ſaid to render Men almoſt immortal. We cannot therefore but allow the tender *Summities* of the young Leaves in *May* and *June*, and afterwards the *Flowers*, a Place in the cold Sallad, ſparingly uſed.

Tarragon. *Tarragon* is of *Spaniſh* Extraction, hot and ſpicy; therefore the Tops and young Shoots are always to find a Place in our Sallads, eſpecially where there is much *Lettuce*. It loves a warm Expoſition, and is increaſed by Slips taken from the Root, and planted in *April*. It endures the drieſt Summer and the hardeſt Winter.

Mint. The Nature of *Mint* is dry, warm, and very fragrant; being a little preſſed is friendly to a weak Stomach, and powerful againſt all nervous Crudities. The tender Tops of it enter very agreeably into our Sallads, and are of great Uſe in Soops and ſome Sauces: And every one knows the Water drawn from it in a *Still* is excellent to expel Wind. It is eaſily propagated by parting the Roots in the Spring; ſhould be removed once in three Years, and will grow almoſt any where. *Baulm.* *Baulm* is much of the ſame Nature and Uſe, and is cultivated from the Roots.

Borrage. *Borrage* hath a pleaſant Flavour, is agreeably hot, and a Purifier of the Blood. The tender Leaves, but eſpecially the Flowers may be eaten in Compoſition. Above all, the Sprigs mixt with Wine, Water and Lemon are of known Virtue in Summer to cheer the Spirits, and to relieve the hard Student. *Bugloſs.* *Bugloſs* is much of the ſame Nature, but ſomething more *aſtringent*. They are *both* increaſed only from the Seed, which preſently falls as ſoon as it begins to be ripe, and therefore muſt be narrowly watched

Cornſallad. *Cornſallad* is of a Nature looſening and refreſhing, and is one of the beſt Winter Sallads; its Tops and Leaves being tender and very agreeable. The *French* call it *Salade de Preter*, becauſe 'tis uſually eaten by it ſelf in *Lent*. It uſually ſows it ſelf; for ſome have obſerved that the Seed will not laſt good above ſix Hours, if kept from the Ground.

Mallow. I cannot omit mentioning the *Mallow* amongſt the Sallad-Race, becauſe, though it is at preſent diſcarded, it was in high Eſteem amongſt the Antients. *Pythagoras* held *Malvæ folium Sanctiſſimum.* The *Garden Sort* is much approved by *Dioſcorides* and *Galen*; but *both* were held by the *Romans in deliciis. Malvæ ſalubres Corpori*, (ſaith *Horace*, *Epod.* II). It bears beautiful and fair Flowers the ſecond Year after ſowing; but as this Plant flowers late in the Year, the firſt Seeds are to be gathered with Care

Dandelion. *Dandelion*, or *Dens Leonis*, though it be an Herb which may be found in almoſt every plow'd Field, yet when it is blanch'd as *Selery*, is eſteemed by many an excellent Sallad mixt with other Herbs. Some macerate it in ſeveral Waters to extract the Bitterneſs. It is ſomewhat opening, a great Antiſcorbutick, and therefore very wholeſome.

Elder. The Flowers of *Elder* infuſed in Vinegar are grateful both to the Stomach and Taſte; and though the Leaves be ſomewhat rank, and ſo not admitted into the Sallad; yet the whole Shrub is of moſt ſovereign Virtue. The Spring Buds and tender Leaves, by thoſe who value and would preſerve their Health, are uſed in Pottage as a wholeſome Breakfaſt.

Parſley. Some few Tops of young and tender *Parſley* are ſometimes admitted into a raw Sallad. There are two Sorts of it, the *common* and the *curled*.

It is of a pretty hot and dry Nature; yet not hurtful to the Eyes, as is commonly thought, but opens Obſtructions, and is very diuretic. This Plant is otherwiſe uſeful in the Kitchen, for Stuffings and Sauces.

Burnet. *Burnet* is another uſeful Plant, and much valued by the *French* and *Italians*, even in their Sallads, for its cheering and exhilerating Quality; believing that if *Pimpernel* (their Name for *Burnet*) be wanting, there cannot be a good Sallad. Every one knows a Sprig of it in *Wine* gives an agreeable Flavour acceptable to moſt.

Sampier. *Sampier*, growing on the Sea-Rocks, hath many valuable Properties; for it is not only one of the beſt Pickles; but when young and tender, is an incomparable Ingredient in a Sallad. For its aromatic Virtue and operative Force againſt Vapours, as well as that it ſharpens the Appetite, is preferrable to moſt of our hotter Herbs, and Sallad Ingredients. Mr. *Evelyn* wonders that it is not propagated in Kitchen Gardens, where it might be had all the Year round, as it is in *France*; from whence he ſaith he received the Seeds, and it proſpered better than what he had from our own Coaſts. It did not indeed pickle ſo well as what grew on the Rocks; but in all other Reſpects for compoſing Sallads, it had nothing like it.

Scurvy-graſs. *Scurvy-graſs*, but eſpecially that of the Sea, is a great *Antiſcorbutick*, is alſo ſharp, biting and hot. It is generally put into Ale and uſed as a Diet-drink; it is of the Nature of the *Naſturtium*, and prevalent againſt the Scurvy. However a few of the tender Leaves may be admitted into our cold Sallads.

Small Herbs. Beſides all theſe there are what the Gardeners are wont to call *ſmall Herbs*, ſuch as ſhould always be cut whilſt they are in the Seed-Leaf, viz. *Muſtard*, *Radiſh*, *Turnep*, *Rape*, *Spinage and Lettuce*. Theſe are all reckoned a great Delicacy, eſpecially when they appear early in the Turn of the Year, when every Thing *green* ſtrikes the Eye, and is taſted with Eagerneſs and Pleaſure. Wherefore to ſatisfy a longing Curioſity, theſe *ſmall Herbs* are raiſed under Glaſſes and Frames; that by their Help they may be defended from Froſts, and be made to preſent themſelves at the Table all the firſt and early Months. They are commonly pulled up by the Roots out of the Hot-Bed, not only to make Way for others of a different Nature, but alſo to gain as great a Length of the *Stalk* as poſſible, which, while it is ſo young, is as good and tender as the Leaves themſelves.

There might be ſeveral other Sorts of Herbs and Plants reckoned up as fit for Sallads, which though neglected here, and perhaps deſpiſed, yet find Entertainment ſtill in foreign Countries. Mr. *Evelyn* tells us, that the large *Heliotrope*, or *Sun-flower*, before it comes to *explain* it ſelf, when dreſſed as the *Artichoke*, is eaten for a Dainty. Even the pale whiter *Popy* is eaten by the *Genoeſe*, and the Tops of *Wormwood* with Oil alone, by the *Spaniards*: *Galen* tells us he was wont to eat *green Rue* by it ſelf with only Salt and Oil, as not only exceedingly *grateful*, but *wholeſome*, and of great Virtue againſt Infection. Nay, *Pliny* reports it to be of ſuch Effect for the Preſervation of Sight, that the Painters of his Time uſed to devour a great Quantity of it. Neither ſhould it be thought ſtrange that the common *Burdock* comes now and then to the beſt Tables in *April*; before any Burs appear. For being ſtripp'd, and the Bitterneſs ſoaked out, and being treated and blanch'd as the *Chardoon*, is eaten in *Poiverade*, and reckoned a Delicacy.

Silphium. But I ſhall chuſe to conclude the whole of what has been ſpoken on this Head with a large and particular Account of the *Silphium* of the Antients; which, if we could procure right and genuine, by the Account we have of its rare Virtues, might readily gain the Precedency of every thing that has gone before, uſed even as a choice Ingredient in our Sallads and Sauces.

Σίλφιον, ſo called by the Greeks; and by the Latins *Silphium*, *Laſer*, and *Laſerpitium*, and by the *Engliſh Aſa* or *Aſſa fœtida*, is an extracted Juice from the Roots of a *Perſian* Plant like a Carrot growing wild in the Mountains, and by the Heat of the Sun and Time reduced to the Conſiſtency of a gummy Subſtance, and ſo brought over to us out of *Perſia*, and chiefly from *Gamroon* by our *Eaſt-India* Merchants. Its Smell (as will appear more hereafter) is very offenſive; eſpecially at or ſoon after its firſt gathering and to thoſe who are not uſed to it: But when it comes to be mellowed by Age and uſed diſcreetly in ſmall and due Quantities, learned Palates have only judg'd it to have an high *reſinous* Smell and Taſte, and to afford a grateful Flavour, agreeable to what *Theophraſtus* ſaith of the Plant and Country that it doth afford ὀπὸν ϖολὺν ϗ ἔυοσμον [*] *abundance of Juice, and that well perfumed.*

It is true *Ariſtophanes* [†] in one or two Places mentions it as a thing *inamœni odoris*, but that muſt be either that he had ſeen none in his Time, but what was extracted from the Stalk or Leaves, the worſt and moſt corrupt Sort; or elſe, that as a Comedian he ſpeaks of its unſavoury Effects, and gives it the ſame Character that he would have done *Garlick* or *Rocombole.*

I was always of Opinion that our *Aſa*, when we have it genuine, is the ſame with the antient *Silphium* ſo much cry'd up for its rare Virtues and excellent Qualities by the Antients: But becauſe I had a Mind to Support my private Opinion by a better Authority than my own, I wrote the following Letter to Dr. *Bentley*, deſiring he would pleaſe to give me his Sentiments of this Matter, which he was pleaſed to do (as the Reader will ſee) in a very obliging Manner.

Reverend Sir,

I Have made bold to order my Son to wait upon you with this; becauſe, tho' I am a Stranger to you, your Character makes you an Encourager of Learning in all its Parts. I have already publiſhed ſomething about Gardening, which the World has kindly received, and being now about to publiſh a new Syſtem of Vegetables, I am at a Loſs to come at any Certainty about the famous *Silphium* of the Antients; that is to ſay, whether we have or know any thing of it at this Day, and in what Part of the World it grows. Mr. *Evelyn* has conjectured that our *Aſſa fœtida* (when we have it not adulterated) is the true *Silphium:* And I am much inclined to be of his Mind; becauſe all our Books writing about Drugs agree that it is the Juice of the *Laſer*-Plant, the old Latin Name of *Silphium*, and the aforeſaid Author thinks that the odoriferous *Benzoin* is nothing elſe but the Extract of the Leaves and Stalks of the *Laſerpitium.* What I now deſire to know of you, Sir, is, whether in your great

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[*] *Theophr. Hiſt. Plant.* l. 4. *chap.* 3. [†] *Ariſtoph. Equit pag.* 239 240.

Reading and comprehenſive Learning you have met with any thing, either to confirm or to contradict this Notion.

I need not ſay to you how full *Pliny* is in his Deſcription and Commendation of this noble Plant, recommending it both for the Table and medicinally uſed; giving alſo Rules by which the genuine might be known from the adulterated. *Ariſtophanes* more than once mentions it, and ſpeaks of the Βάττȣ σίλφιον as a thing of the higheſt Value; nay even his comical Deſcription of the Effects thereof in his Ἱππεῖς may ſerve to ſhew us ſomething of its Nature and Uſe. *Athenæus* alſo ſpeaks of it as one of the greateſt Delicacies in *Condiments*; and all the old Phyſicians mention it with Reſpect; *viz. Dioſcorides*, *Hippocrates* and *Galen*. From this *laſt* it is recommended by *Sanctorius* under the Name of *Succus Cyrenacicus*, which *Quinſey* his Commentator (ignorant of the Plant) could not underſtand. You know *Herodotus* mentions a Sort of Weazel, that is ſuppoſed to breed and lie under this Plant; accordingly we have the Figure of it in a Medal of *Battus* at this Day. I ſhould be glad to know your Sentiments, and whether it will help us to diſcover its Nature and Properties.

I have not yet been able to learn from whence our *Aſa* comes; but as it is, it gives a noble Flavour diſcreetly uſed in Sauces. I ſhould not think it impoſſible, if the true *Silphium* Plant could be found, but we might bring it over with Care, and naturalize it with us, as we do moſt other the tendereſt Exotics, and then we might be ſure to have genuine what the Antients ſo highly extol. For I confeſs my Zeal in this Matter carries me to think no Pains or Care can be too much to compaſs what was always accounted ſuperlatively excellent to a Proverb. You will be ſo good as to pardon this Freedom, and to believe that whatſoever you ſhall think fit to communicate to me about this Matter, ſhall be made uſe of with all Honour and Fidelity, by

SIR,

To Dr. *Bentley*,
Nov. 1724.

Your moſt obedient humble Servant,

J. LAURENCE.

To which the learned Dr. was pleaſed in a little Time to ſend me the following kind and obliging Anſwer.

Reverend Sir,

THAT the modern *Aſſa*, corrupted from *Laſer*, λασάριον, is the antient *Silphium* I have been long convinced; but our Merchants import commonly the worſt rotten Stuff, which has deſervedly given it the Epithet of *fœtida*. I once met with a Quantity ſo good, that I convinced Dr. *Mead* and other Phyſicians, that it was genuine *Silphium*: Beſides all other Marks to which it anſwered, I appeal'd to that deciſive one in *Pliny*. *Probatio ſinceri prima in Colore modice rufo* (Dioſcorides ὑπερύθρῳ) & *cum frangitur candido intus*. I carried a Piece to Dr. *Mead's*, &c. and ſhewed them firſt, that the Outſide was Pink-colour, ὑπερύθρον, then with a Knife I cut a thin Slice off and it was white, and that new white Surface in two Hours Time turned *Pink* again; and ſo it would do *toties quoties.* This convinced every one; for what other Drug will turn Colour ſo upon breaking or cutting?

The *African Silphium* was loſt before *Pliny*'s Time, and he relates the Cauſe of it. What was in Uſe in his Time came all from *Parthia* or *Media*, and was the very ſame with that of *Africk*, and ſometimes (as *Strabo* ſaith) was better than that. The Reaſon of it is, that it was a *Manufacture*, the Juice being mixt with fine Meal, to give it a Conſiſtence and to keep it from ſticking like Tar or corrupting. So no Wonder the *Cyrenean* generally excelled; becauſe they had better Markets to vend it in, which encouraged them to be cleanly about it.

It doth not appear that the Creature you call a Weazel fed upon the Plant of *Silphium: Herodotus*'s Words γαλαῖ ἐν τῷ Σιλφίῳ γινόμεναι do not warrant that. *Herodotus* (if you compare Chap. 192. with Chap. 169.) calls Σίλφιον not the *Plant*, but the *Countrey* where *Silphium* grew; which according to *Theophraſtus* and *Pliny* was four Thouſand *Stadia i. e.* five Hundred Miles Square. In that Countrey therefore this Weazel was frequently; not that ſhe eat the Plant. Rather than ſuffer that, the *Cyreneans* would have uſed them as the *Britains* formerly did Wolves. Beſides, one of theſe Weazels was brought alive from *Africk* to *London* within this five Years; and yet no Account informs us, that ever *Silphium* grew in *Africk* ſince the Time of *Pliny*.

All the *Aſa* now uſed in *Europe* is brought by the *Eaſt-India* Companies, and they have it in the *Indies* from *Perſia*. It now grows where it always did, in the barren deſolate Mountains of *Perſia* called by the Writers of *Alexander*'s Expedition *Caucaſus* or *Paropamiſus*. This you will ſee in *Strabo* and *Arrian*. If you can get a Book publiſhed about ten Years ago by one *Kempfer* a *German*, that practiſed Phyſick in all the Orient for ſeveral Years, you will ſee a particular Chapter about *Aſa*. He went from *Iſpahan* on Purpoſe to ſee the Countrey Peaſants fetch their Harveſt of *Silphium* out of thoſe Mountains. He gives you a Picture of the whole Plant, Root, Stalk and Leaves; and it agrees with the Greek Account of the *Cyrenean Silphium*; except ſuch ſmall Differences as may be allowed between a Man that ſaw it himſelf, and *Theophraſtus* and *Dioſcorides*, &c. who never had ſeen it. The Root is like in Bulk to a large Carrot-root: They cut the Top of it with a Knife, hollowing it toward the Center; the next Morning the ὀπὸς *Silphium* is owzed out like a Cream; this is ſcrap'd off and put into a Pot: Then they cut the Root again the Thickneſs of a Crown lower, and the next Morning freſh Cream is produced. This is repeated three or four Times, and ſo the Root is left and periſhes.

Now they gather nothing but the Juice the ὀπὸς: Antiently they uſed Stalks and Roots, exhauſted of the ὀπὸς, pounded or grated, as we now do Sugar or Pepper. The *Perſians* as well as *Africans* uſed this, Time out of Mind. You may ſee in *Polycenes lib.* 4. that *Alexander*, after he had ſubdued *Perſia*, found in the Regiſters a Liſt of the daily ſtated Allowance for Dinner and Supper for the *Perſian* King's Palace; amongſt which are ὀποῦ σιλφίου δύο μναῖ, σιλφίου τάλαντον σταθμὸν, two Pounds of the Juice of *Silphium*, of the dry'd Stalks and Roots, above an Hundred Pound Weight. The poor *Athenians* in *Ariſtophanes*'s Time ſeem to have had no better than Καυλὸς, the *Stalk*, which was the worſt and cheapeſt.

Benzoin is not (as ſuppoſed) an Extract of *Silphium*, but from a quite different Plant; as you may ſee in *Jacobus Bendries de Medicinâ Indorum*, who ſaw both Plants. I have ſeen ſeveral Inſtances where the *Aſa* (when perfectly good to *Pliny*'s Proof) has done as great Things in Medicine, as ever the Antients mention: In Sauce it daily grows more into Uſe among the Quality. I am afraid your Wiſh of tranſplanting it hither will have no Effect; for all Accounts, old and new, declare it uncapable of removing, or of Culture; yet query in *Hortus Malabaricus*, if the *Dutch* Gardeners have cultivated it. I am with all Reſpect,

Yours,

R. BENTLEY.

This kind Letter of the Doctor's gave me conſiderable Light, and put me upon further Enquiries, particularly how to procure *Kempfer*'s Book; which at Length after ſome Time and Difficulties I obtained in *London*. And becauſe the whole Chapter about *Aſa* is very curious and particular, for the Benefit and Entertainment of every Reader, I will give it here entire rendered into *Engliſh*. Which is as followeth.

The Hiſtory of the Aſa Fœtida *of* Diſguun.

The *Hingiſeh* is an umbelliferous Plant, a-kin to *Lovage*, with branched Leaves like Piony; a full and large Stalk; an edged, leafy winged, Seed, naked and ſingle, like that of *Branc-Urſin* or *Parſnip*; and a Root yielding *Aſa Fœtida*. Its Root lives for many Years; is large, heavy, naked, black on the Outſide, which in a clayie Soil is *ſmooth*, in a Gravel *rough*, and as it were *wrinkled*; for the moſt Part ſingle like a *Parſnip*, but oftentimes branch'd into two or three at a ſmall Diſtance from the Top; ſome of which grow perpendicularly down, others run obliquely and irregularly juſt as they are bent and twined by what they meet in their Way. The Top of the Root throws it ſelf out of the Ground, and is ſet round and thick, like the *Peucedon*, with rough Fibres ſtanding up like Briſtles of a rediſh brown Colour. It hath a fat juicy Rind, that eaſily comes off as one pulls up the Plant, and on the concave Part of it is ſmooth and moiſt. The Subſtance of the Root is heavy, ſolid, and white, like a *Turnep*, full of a Fat, very white and very fetid Juice, with a horrid ungrateful Smell, of the Garlick Kind, which is called by the *Perſians* and *Indians*, *Hing*; and by the *Europeans*, *Aſa Fœtida*. The Leaves ſpring out from the Top of the Root in the latter End of Autumn ſix or ſeven in Number, and always more or fewer in Proportion to the Greatneſs of the Root; all Winter they flouriſh greatly, and wither away about the Middle of the Spring. The *Leaf* is branched out into ſeveral Parts, even about a Cubit long, ſhaped for the moſt Part like the *Piony*, and of the Subſtance, Colour and Smoothneſs of *Lovage*: It hath a Smell not ſo ſtrong as that of the Root, and a rank Taſte joined with a Bitterneſs and aromatick Keenneſs. It conſiſts of Stalk and Branches. The Stalk is a Span or more long, not ſo thick as a Man's Finger, with Ridges winding round, like a Screw, ſtringy, and of a Graſs Colour, channelled towards the Bottom by Reaſon of the Leaves incloſing one another, in the upper Parts round. Each Branch hath upon it *five*, more rarely *ſeven* Wings placed on the oppoſite Sides, but not directly over againſt one another, ſomewhat more than a Hand's Breadth long, running obliquely upwards, the lower one is longer than the others. The Wings are divided of each Side into ſeveral Lobes of uncertain Number and unequal Bigneſs, oblong and ſomewhat oval; in ſome Plants very narrow and long, diſtinct and at a good Diſtance from one another quite to the Ribs; and thus being few and ſeparate from each other, every one looks like a Leaf by it ſelf; in others they are broader, ſhorter, and more grown together, with oval or circular Indentures in them, according as Nature hath been pleaſed to divert herſelf in forming them, which ſhe does with ſuch Variety, that the Difference of the Leaves ſhall make the Plants appear as if they were not of the ſame Species. The Lobes run obliquely upwards, are narrow at the Bottom, and lie along by the Sides of the Rib of a Sea-green Colour, ſmooth, juiceleſs, ſtiff, and brittle, a little hollow on the lower Side: They have one ſmall String running from the Rib unequally along them, very rarely accompanied with others on each Side of it. The Bigneſs of the *Lobes* is uncertain; but one may reckon them at a *Medium* about three Inches *long* and one *broad.* Before the Root dies (which generally happens in the latter End of Summer) there riſes, with a Number of Leaves round it, a ſingle, ſtrait, round, furrowed, ſmooth, herbaceous Stalk, or Stem, which grows up to the Heigth of ſix or nine Foot or more; at the Bottom it is larger than the Graſp of a Man's Hand; it grows leſs by Degrees and is divided into a ſmall Number of Branches, and they again ſubdivided into Umbrellas, like the reſt of the ferulaceous Plants. It is ſurrounded with very ſmall Leaves, which grow alternately about the Diſtance of a Hand's Breadth from one another; which, with their broad, membranous, and ſwelling Baſes, cling about the Stalk unequally and croſſways to each other; and when they fall off leave Marks behind them, which make a falſe Appearance of its being divided into Joints. It is exceeding full of a very white fungous Pith not broken by Joints, but with a few ſhort Fibres amongſt it running irregularly lengthways. The Umbrellas are upon a Stem of a Foot, others of a Span long, or yet ſhorter, and ſhoot out into ſeveral *radii* diſpoſed circularly; each of which making a Kind of ſmaller Umbrella ends in a few little *radii* of about two Inches long; and on theſe grow the Seeds naked and upright upon ſhort and very ſmall Stalks. The Seed is plain and *edged* (or *leafy Foliaceum)* of a rediſh brown, oval, nor unlike the Seed of *Sphondylium* or the *Garden Parſnip*; but ſomewhat larger and blacker than the latter, a little hairy and rough, marked with three Furrows, one of which runs through the Middle, and the others wind along the Edges, and all reach from End to End. It hath a ſmall Scent of Garlick and a ſtrong ſmart bitter Taſte. In the Middle of the outward Shell or Husk is contained the true Seed which is black, flat, and oval, ending in a ſharp Point. The *Flowers* I did not ſee, but they ſay they are very ſmall ones, and of a whitiſh pale Colour, and I do not queſtion but they conſiſt of five *Petula* or Leaves.

§. 2. The Plant of *Aſa Fœtida*, is called by *Avicenna*, *Andsjudaan* and *Haltüt*, which Word *Dioſcorides* renders σιλφιον, and *Mathiolus Laſerpitium.* In its own Countrey both the Root and the Juice it affords, are called *Hingiſeh*, and in *India*, *Hüng.* But in common Speech the Word *Hingiſeh* is uſed for the Plant, and *Hüng* for the Juice; and in theſe

Senſes I have uſed theſe Words in my preſent Deſcription. Whence the Name *Aſa* is derived or corrupted, I enquire not. The *Germans* from its ſtrong and offenſive Smell give it the Name of *the Devil's Dung.* I give you here a genuine Hiſtory of this Plant (which by the Conjectures of Botaniſts hath been referred to ſeveral different Species, and by the famous Criticks, *Scaliger* and *Salmaſius*, ſet forth by its proper Marks and Names) from my own Inſpection and Obſervation of it, having for that Purpoſe taken a tedious and fatiguing Journey from the City of *Gamroon* to the Countrey where it grows. *Perſia* only is its native Countrey, not *Media*, *Lybia*, *Syria*, or *Cyrene:* Wherefore all the ſeveral Diſtinctions that are to be found in Authors, between the Juice of this or that Countrey's Growth are inſignificant. I was informed by two *Chineſe* Dealers in Spices, that this Plant grows in their Countrey near the *Walls*, and hath a Juice gathered from it; but I am not ſatisfied of the Truth of this, becauſe I do not find any Mention made of this Plant in the *Chineſe* Herbal, for the importing the Gum by the Way of the *Wall* may have given Occaſion to ſuch a Miſtake among the Ignorant. There are at this Time but two Tracts of Land in *Perſia* which produce this Plant, *viz.* the Fields and Mountains near *Heraat*, a Market Town in the Province of *Choraſaan*, and a Range of Mountains in the Province of *Laar*, which reach from the River *Cuur* to the City of *Congo* along the *Bay* of *Perſia*, at the Diſtance of two, or in other Places three or more *Paraſangs* from the Shore. But it is not in every Part of either of theſe Tracts, that the Plant yields any Plenty of Juice. But about *Heraat that only* which grows in the wild Champion Countrey, and in the Province of *Laar*, *that only* which is found upon the Mountains near the Town or Territory of *Diſguun.* What grows on either Side of theſe Places, either yields a ſmall Quantity of Juice, and is therefore not worth the Pains of gathering; or, if it will yield any, there is no body to gather it. For on this Side of *Diſguun*, the Inhabitants of the Countrey, who are *Arabians*, Husbandmen brought over from the oppoſite Shore, and Strangers to every other Way of Life but as Shepherds, never attempt to gather any of it, but concern themſelves only for the Supplies of a low and humble Life, which they lead in poor Tents, and become ſupine and thoughtleſs of every Thing beyond their own wretched Subſiſtence, and the Care of their little Flocks. Beyond this Place, *i. e. Diſguun* the Plant is ſaid to have loſt almoſt all its *offenſive* Smell, and grown ſo *ſweet*, that the *Goats* are fond of the Leaves, and feed themſelves exceeding fat with them. To make them do ſo, *i. e.* grow fat, the Day before they graze there, they are fed once with Mountain Salt (the only Sort they have there) and for the firſt fourteen Days after they begin to feed on it, they are never ſuffered to drink. The Plant grows indifferently in Thickets and craggy Places, and indeed wherever the Wind ſcatters the Seeds; but moſt plentifully (and often at no more than a Foot's Diſtance between the ſeveral Plants) in Places flatted and ſunk into a Plain, as being fitter for *retaining* (and upon Account of the better Condition of the Soil) *nouriſhing* the Seed. It ſeldom grows in a moiſt or rich Soil; but more frequently in a ſtony rocky dry Soil, with a ſmall Mixture of Clay; and if the upper Part of the Land furniſhes not Moiſture enough, it ſupplies it ſelf with it from below, by ſtriking the deeper Root. The People of *Heraat*, account that which is called *Hingiſeh*, and grows (they ſay)

i. e. *The Walls that divide* China *from* Tartary.

See Pliny *and* Thephrus.

upon the Mountains and in the Woods of *Diſguun*, a different Species from that which they call *Husjeh*, growing in their own Fields. The former (they tell you) affords but a ſmall Quantity of *Juice*, and even that *thin* and *weak*; whereas theirs at *Heraat* yields Abundance of *Ouze* more fat, unctuous, and fœtid, and *therefore* much the better Sort. To try the Truth of this, and to obſerve in what Reſpects they differ'd, I carefully compar'd a Plant of the Growth of *Heraat* (which whilſt I dwelt at *Gamroon* I procur'd from *Choraſmia*, and *had loſt a great Part of its Strength)* with one of *Diſguun*, and I profeſs I found no Difference in the Shape. I then ſhew'd the Plant of *Diſguun* to the Carriers of the *Aſa* of *Heraat* (who yearly brought it to *Gamroon)* not telling them of which Growth it was, and they immediately declar'd it to be their own, the *Husjeh Plant*, the Parent of the true and genuine *Aſa:* Whence I gather, that the Difference between the Plants of *Diſguun* and *Heraat*, ariſes only from the Difference of Soil in thoſe two Places. That of the Fields of *Choraſmia* is perhaps a fatter Soil, and therefore furniſhes the Root with a larger Quantity of Juice, than the barren Ridges of the Mountains of *Laar* can afford it; to ſay nothing of the Juices of the Plants of each Province, which compar'd together afford not the leaſt Suſpicion that they are of a different Species; but are exactly alike, except in Caſes where a Difference is made either by Adulteration, or by the Seaſon or Manner in which they were gathered, as will appear more fully by what follows. The People of *Diſguun* diſtinguiſh between the *male* and *female* Plants; thoſe of the *former* Sex, they ſay, yield no Juice, but ſhoot up into a Stalk which produces Seed, and by that Means they die at the Root; the *latter*, afford the Juice, and have no Stalk; however this is a falſe Diſtinction, and made through Want of due Attention; for there is no Root ever found but what will yield Juice, if it be cut before it runs to Seed like Fennel; for it will, if left to it ſelf, ſooner or later ſhoot out a Stalk; after which being deprived of its *vital Moiſture* it withers and dies, which is common to it with moſt other Plants of the umbeliferous Kind. The Root is ſaid to live a vaſt while, even to vie with the Life of a Man for Duration; wherefore 'tis no Wonder if the Roots ſometimes be found of a monſtrous Size. If the Nature of the Soil be ſuch, that it riſes not to a Head in the former Part of its Life (as it ſometimes ſo happens) they affirm the Stem will grow to ſix Foot in Length, and to the Thickneſs of an ordinary Man's Waſte. In its middle Age 'tis as thick as a Man's Leg or Arm, and the Thickneſs got by one Years Growth is that of ones Thumb; always anſwered with a proportionable Length. The Fibres around the Head are ſometimes a Mark of Age, and I am apt to think they are the Remains of the Stalks of the Leaves which have fallen off, and were too nervous and firm for the Teeth of Time to deſtroy.

§. 3. All *Aſa fœtida* flows from the Root when 'tis cut, and none either flows of it ſelf, or can by any Art be preſſed out of the Stalk; that Diſtinction therefore of the famous *Wormius*, between the *Aſa* of the Root and that of the Stalk, comes to nothing. A Root under four Years Growth yields very little Juice, and is never cut; but as it grows older and larger it yields proportionably more Liquor.

If it be taken out of the Earth and not cut till the next Day, yet a milky Juice will flow from it; ſuch a Quantity of Juice it abounds with, that it becomes uncommonly heavy. If it be cut through Croſs-wiſe, its whole upper Surface will be overſpread with this milky Juice, which ſprings up in a continued Line winding irregularly, as may be ſeen in the Figure annexed. If we obſerve the Root carefully, we ſhall not find it all of the ſame Subſtance; but in ſome Parts of a fibrous and harder Subſtance, the Fibres running lengthwiſe in an irregular Manner; and in others of a ſofter, more ſpungy and homogenious one; the latter ſeems deſign'd for retaining the Liquor and digeſting it in *its* Veſſels, the former for the Circulation and Conveyance of it to nouriſh the Stem: And I add alſo, that it contributes to the making the Root firmer and more durable, which is of it ſelf brittle and fragile. When the Root is dry'd from all its Moiſture, it loſes all its ſofter Parts, and the fibrous ones only remaining, are contracted into a ſtringy Pith; but the rough Bark loſes little of its Dimenſions. The Liquor, when it firſt flows from out the Veſſels of the Root, is very white, liquid and fat, exactly like the Cream of ſweet Milk, and therefore not in the leaſt clammy; but by being kept in the Air or Sun it changes its Colour to a light brown, and grows firmer and glutinous. Its Scent is the Teſt of its Excellency; the ſtronger it is, the better the *Aſa*. When it firſt comes from the Root it is of a prodigious ſtrong Scent, above what it is when grown firmer by Age, and arrives in *Europe*; indeed there is no Compariſon between them; I dare affirm that one Drachm of *Aſa* freſh from the Root will caſt a ſtronger Smell, than a Hundred Pounds of ſuch as is dried by long keeping, and is uſually ſold by our Druggiſts. When I returned from the Mountains I carried home with me a pretty many Roots (into a very large Houſe with a Court in the midſt of it) but they filled every Room in it with ſo noiſome a Scent, that I was forced immediately to fling them away. When the *Caſila* (a Word they uſe for a Drove of *Laden* Cattle, and their Drivers) arrives with *Aſa* from *Choraſmia*, this Sort of Ware is always unloaded in a Field at a good Diſtance from the City; but notwithſtanding this, if the Wind blows from that Quarter, the whole Air of the Place is infected with its Stench. It muſt be carried into *India* in a Veſſel by itſelf, not with any other Wares that are liable to be corrupted; for Experience teaches, that it will infect and ſpoil them every one, and does the ſame by all *Liquors*; eſpecially thoſe that are ſuppoſed to be drank. The *Veſſel* in which I croſſed over into *Arabia*, had one ſingle Sack of *Heraat Aſa* hanging at her Stern, which made us horribly uneaſy with its offenſive Smell; and the Maſter of the Ship was apprehenſive, that even in that little Way, it would do harm to the *Roſe Water*, *Schiras Wine*, and the *Eatables* on board.

Dioſcorides B. 3 Chap. 78. has given us a long Liſt of the Medicinal Virtues of *Aſa*, and *Gazzias Arom. Hiſt.* B. 1. C. 3. has ſaid a great deal of its Excellency that Way. The *Perſian Phyſicians*, by Reaſon of the Nicety of that People, hardly ever uſe it. The *Peaſants* of the Province of *Laar* became acquainted with its Efficacy in curing *Cholick Pains*, the *Dropſy*, and eſpecially the Tympany, from the Advice of the *Banjans*. A Citizen of *Diſguun* himſelf told me, that he was afflicted with it (the Tympany) and that by ſwallowing a *Bolus*, or large *Pill* of *Aſa*, every Morning for ſix Weeks together, he was perfectly recovered. During this Courſe of *Aſa* the Wind diſcharged it ſelf ſo frequently upwards and downwards, and was of ſo abominable a Scent, that he was forced to baniſh himſelf from all Society and Converſation.

The *Seed* of the Plant has the ſame Effect, but in a leſs Degree, and therefore the *Indians* fetch it hence for Phyſical Uſes. Wounds are ſaid to be heal'd to a Miracle by the Application of *Aſa* freſh gathered. If this Plant be laid in any Furrows where Water drains, and from thence runs into any Gardens or Groves of *Palm* or *Date-trees*, that Water will kill all the Worms at the Root of any Plant whatſoever. The *Indians* (eſpecially the *Banjans*) uſe *Aſa* commonly in their *Sauces*. The famous *Renodæus* could hardly be brought to believe this Account of it given him by *Gazzia*; *For*, ſays he, *if this be true*, *ſurely either Aſa fœtida does not ſtink in* India, *or the* Indian'*s Palates are made of Braſs*. I my ſelf have taſted Cakes that have been mixt with this Liquor, which have had a far more tolerable Reliſh than I expected from them. 'Tis a common Thing among *Banjans* to rub the Rims of their Cups with this Liquor, to raiſe an Appetite in thoſe who were out of Order.

Mat Med. Lib. I. § viii. chap. 8.

There is a very great Scuffle between the Men of *Heraat* and *Diſguun*, whoſe *Aſa* is to be preferred; each thinks to advance the Worth of their own Commodity by decrying the Value of the others. At *Heraat*, the *Aſa* of the Mountains of *Diſguun* is decried, as lean, dry and of a baſtard Kind; whilſt their own is declar'd to be fat, ſoft, and of the higheſt Scent. The Men of *Diſguun* reply in Behalf of the *Aſa*, that the Fatneſs of the *Heraat Aſa* is not natural but forced, by their mixing it at its firſt gathering with the *Cream* of *Camels* or *Goats*; by this Means they think it does not harden ſo ſoon, nor will it keep ſo long of it ſelf, as when it is thus ſophiſticated; thus (ſay they) the Buyer is cheated into a Belief, that what is really the Fatneſs of the Mixture, is the genuine Richneſs of the *Aſa*. Envy and the Love of Gain engendered this Quarrel; but there is no Reaſon thence to conclude the *Aſa*'s of theſe two Places to be of a different *Species*; wherefore without Regard to this or any other Diſtinctions made by Druggiſts, I ſhall only diſtinguiſh between the Plants themſelves and the *Aſa* they produce, as they grew in *Fields* or *Mountains*; at *Heraat* or *Diſguun*, or if you had rather uſe the Names of the Provinces they grew in, of *Choraſmia* or *Laar*; the *one* is for the moſt Part fatter and ſofter, and brought over wrapt in Sheep and Goat's Skins, the *other* is drier and comes in Bags made of the Leaves of the wild Palm-tree. As all my Obſervations were made upon the *latter*, ſo I here give you an Account of the Manner of gathering it, which is the ſame with that of gathering the *Heraat Aſa*, except in a very few Circumſtances.

§. 4. The Harveſt of *Hingiſeh* or *Aſa* is gathered by ſome of the Inhabitants of the neighbouring *Villages*, but chiefly by the major Part of the People of *Diſguun*, who are in all about three Hundred; and is compleated in four *Seaſons*, or, which is the ſame, in going four Times from the *City* to the *Hills* where the *Hingiſeh* grows, which are ſome two, three, or four Paraſangs diſtant from it. I will relate to you the Order of the ſeveral *Times* or *Seaſons*, in which the *Harveſt* was reaped by the People of *Diſguun*, that Year I viſited theſe Mountains, *viz. Anno* 1687. The Order indeed is always the ſame, tho' perhaps the Day on which they begin their *Harveſt*, or the Diſtances between the ſeveral *Seaſons* of it, be not always exactly the ſame.

Firſt Seaſon.

1. Before ever they began their Work, they made Enquiry what the foreign Demands for *Aſa* were, that they might not ſpend their Time and Labour in vain; as ſoon then as they are aſſured of a Vent for it, they flock to the Mountains about the Middle of *April*, becauſe that is the proper Seaſon to prepare the Root for yielding its Moiſture; of which the Paleneſs, drooping and withering of the Leaves, is a certain Sign. If the Peaſants of the neighbouring Villages determine to gather any, they repair thither in the ſame Month. When they arrive, they diſperſe themſelves and keep at a great Diſtance from one another, ſo that they who have agreed to make one common Stock of what they gather, whether they are a ſingle Family, or a Number of Families related to each other, or the People of one particular Street thus agreed, pitch ſeverally upon a certain Tract of the Mountain and gather there. Here each Man chearfully falls to Work on the Plants he finds; and firſt, with a Spade takes away the Earth a little Diſtance around the Root, which is commonly a firm Sand or Gravel, to about a Span's Depth, ſo that the Root appears naked a good Height out of the Ground. Secondly, he takes the Stalks of the Leaves croſs-wiſe in his Hand and twiſts them off from the Root, which in that Seaſon of the Year is eaſily done; then takes off the rough Crown of Fibres from its Head, which appears underneath bald and wrinkled. Thirdly, with his Spade or Hand he breaks the Clods of Earth he dug up, and covers the Root again with them to the Top; and then upon the Earth he lays the Leaves he has pull'd off, or any other that chances to be near him, with a Stone upon them, leſt the Wind, which is here often exceeding violent, ſhould carry them away, and he at his Return not know where to find the Root.

N. B. The Reaſon of thus covering the Root is to defend it from the Sun's Heat; for were it expoſed to it, it would in twenty four Hours putrify and yield no Profit to the Labourer. After they have thus prepared many Thouſand Roots for gathering, (four or five Men uſually prepare two Thouſand) they leave the Mountains and return Home, having in about three Days Time, finiſhed the Labour of the firſt Seaſon which they call *Kuſtian*, *i. e.* to *kill*, as if this were an *act* [*or the Seaſon*] *of Slaughter*; becauſe in this Seaſon the Plants are condemned hereafter to dye, by being drain'd of their vital Juice.

Second Seaſon.

After forty Days ſpent at Home (this Year they ſtaid longer than they uſually did) the whole Rout of Gatherers leave the *City* in the Evening, and in the Morning the twenty fifth of *May* arrive at the Mountains, they then divide themſelves, and each Body goes to its allotted Tract of Ground, to collect the *Liquor* from the Roots prepar'd in the Manner deſcrib'd above, which being here got together for the Nouriſhment of the Leaves, now all ſtagnates at the Top. The Inſtruments they had, were a ſharp *Knife* for cutting the Root, a ſort of Slice or Spattle made of Iron, broad at the End, to ſcrape the Juice from off the Root, a *Diſh* or *Cup* fixed upon their Side to put the Juice into as they ſcraped it off, and two *Baskets* hanging by a *Yoke* from the Shoulders, in which they carry off the whole Quantity of Juice they gather. The Reader ought firſt to be told that every Company divides its Portion of Land, and conſequently the Roots therein into two Parts, and all in the Company work in each Part every *other* Day; becauſe after the Root has afforded a good deal of Moiſture, it requires Time both to yield freſh Liquor and to thicken what it has already yielded; that this may appear to the Eye, let the Reader view the Figure annext, which repreſents ſuch a Part of a Mountain where the *Hingiſeh* grows, as much as is uſually ſufficient for one Company of Reapers. In this Figure, *A* is one Part, *B* another; I have drawn but one Root in each Part, becauſe a ſingle Root will ſerve to explain what I ſhall ſay, as well as a Multitude. Having ſaid this, I proceed; In *A*, each Man takes a Root, and removes the Bundles of Leaves and throws by the Earth which covers the Top of it: He then cuts off the rough Top of it croſs-wiſe and leaves the upper Surface concave, whither the Liquor flows, without any danger of running over, 'till after two Days 'tis ſcraped off. Then as in the former Seaſon he again covers the Root from the Injuries of the Sun's Heat, and takes care to lay the Leaves over the Surface arch-wiſe, that they may not by preſſing upon it wipe off the Juice. When their Task is finiſhed for that Day, the next Day the twenty ſixth of *May*, is ſpent from Day-break in the like Labour, in the other Part *B*: On the twenty ſeventh they reviſit the Part *A*, and after having taken away the Shelter of Leaves, they ſcrape off the Liquor they find at the Top of the Root and put it into the *Diſh* that hangs by their Side. Then they take away a little more of the Earth about the upper Part of the Root, and with their Knife cut off the dry Surface about the Thickneſs of an Oat Straw; for 'tis enough, if juſt the outward Superficies be cut off which ſtopt the Pores up, which, (when that is removed) diſcharge themſelves of their Liquor; and indeed they have experienced that the thinner the Parings are, the freer and more plentifully the Root flows again. The ſame Perſuaſion they have of the Preferableneſs of one Manner of cutting it which they require ſhould be performed by *ſtriking* the Knife through, and not the common Way of *drawing* it backward and forward; which they ſay doth not make it bleed ſo plentifully as the other; but let them anſwer for it that believe it.

N. B. The Reapers frequently empty the *Diſhes* which hang by their Sides, and then put the Juice into larger Veſſels, or pour it into Leaves laid upon the Ground, that the Sun's heat may ſtiffen it; by which Means alſo it loſes its natural Whiteneſs, for its Subſtance being ſoft and differently ſituated, admits the Sun's Rays in a greater Quantity in ſome Parts than in others; I add alſo that its *Colour* may be affected by what it is *laid upon* when freſh gathered.

Thus after the Root is covered again the Work is done: On the twenty eighth the ſame Buſineſs is done and in the ſame Method in *B*. On the twenty Ninth they return to the Part *A*; and when they have gathered the Liquor from the Root a *ſecond Time*, they take away the Earth, cut it, and cover it again as before. On the thirtieth the Liquor in the Roots in the Part *B*, is gathered a ſecond Time and the Roots cut, &c. This is the Work of the ſecond Seaſon, in which the Roots are *thrice* cut, and the Liquor that pours out of 'em *twice* gathered. Then each

Man puts his whole Collection into the Baskets, which hang on each Side of him from a Yoke laid a-croſs his Shoulders; and carries it away.

Each Company of four or five Men carry off about ten or twelve *Maan* of *Diſguum*, *i. e.* about fifty *German* Pounds.

N. B. This *Aſa* of the firſt gathering is not eſteemed the *beſt*, but rather a *meaner* Sort.

Third Seaſon.

After ten Days Time (eight will do) allow'd for the Roots to ſupply themſelves with freſh Liquor; on *June* 10. at Day-break they return to the Part *A*, and go on with their Harveſt. Having remov'd the Shade of Leaves, and the Earth from about the Root as before, they ſcrape off the Liquor from the Top of it, and then cut it again and cover up the freſh Wound as before. On the eleventh they do the ſame in the Part *B*.

N. B. This Liquor, which in ten Days Time flows from the Roots in a larger Quantity, and is of a due Conſiſtency, is called by a peculiar Name, *viz. Piſpaas*, the other goes by the common Name of *Sjür*, i. e. *Milk*, from its Whiteneſs and Want of Conſiſtency. The *Piſpaas* is commonly eſteemed much better and is a great deal dearer than the *Sjür*; whether on Account of its Scarcity, or its greater Conſiſtency, I know not; this I am ſure of, that the *Sjür*, though 'tis thinner, is not of a worſe Subſtance than the *Piſpaas*; for if it be longer expoſed to the Air it grows full as firm, and cannot be diſtinguiſhed from it. I am apt therefore to think that a Miſtake in the Matter might ariſe from hence, *viz.* the People of *Diſguun* never before ſold the *Aſa Sjür* pure and genuine, but always mixt it with ſome naſty Stuff or other, which was eaſily done when it was freſh gathered, becauſe it was ſo liquid and thin; whereas the *Piſpaas* being much more conſiſtent and firm will not mix with any other Thing, and is therefore ſold neat and pure. All *Aſa* is of itſelf ſimple and unmixed, therefore all heterogeneous Matter in *Aſa* comes by Adulteration. The Reapers themſelves confeſſed to me, that they uſed to mix with the *Sjür Aſa*, not *Meal* or any Sort of ſagapenous *Gum*, as moſt Writers have thought, but a *pure Clay* which was juſt at Hand on the Mountains, where they gather it. Moſt, they ſaid, put an equal Quantity of this to their *Aſa*; others twice as much; or in Proportion to their Deſire of Profit; ſtill putting in the more, the thinner the *Aſa* was. This made the Price of this *Aſa* very low; and after the Cheat was diſcovered the *Aſa* of this Sort was deſpiſed; and indeed they who thus adulterated it ſuffered enough for it; for no Body now would buy any *Diſguun Aſa* for Fear of this Impoſition. But that having now learned more Prudence, they no longer uſe any Kind of foreign Mixture, but put the *Aſa*'s of each Sort, and gathering promiſcuouſly together, and carry it in Bundles to *Congo* and *Ormus*, whence 'tis exported. And that if there is yet any Mixture in it, it is through the Negligence of the Gatherers, in not covering the Roots carefully after they have cut them: Though indeed all their Care cannot prevent Dirt and Duſt from falling from the Leaves that ſhade the Roots, or from being blown upon them by the Wind, which will in ſome Meaſure foul the Liquor.

On the twelfth Day in *A*, and on the thirteenth in *B*, they gather the Juice *Sjür* and cut and cover the Root again; on the fourteenth they do the ſame again in *A*, and on the fifteenth again in *B*. So the Roots after having yielded once the thicker *Aſa Piſpaas*, and twice the thinner *Sjür*, are left under their Covers.

Fourth Seaſon.

After three Days ſtay at Home, on the Third of *July* they viſit the Roots again; having been taught by Experience that in a longer Intermiſſion, after they have been ſo often drained of their Moiſture, and brought nearer and nearer Death, they will be apt to putrify, and whatever Liquor they have then in them, would be loſt by deferring the gathering of it any longer. The firſt Day is ſpent in gathering the *Aſa Piſpaas* in *A*, in the Manner before deſcribed. The fourth Day is ſpent in *B* in the ſame Work. On the fifth Day they gather *Aſa Sjür* in *A*, and on the ſixth in *B*. On the ſeventh Day the finiſhing Stroke is ſtruck in *A*; they get what Juice they find there and cut the Roots no further, but leave them uncovered, whereby the Air and Sun preſently kill them. On the eighth Day they finiſh the Work in *B*, and leave the Roots, in the ſame Manner to take their Fate. Thus is the *Harveſt* of *Hingiſeh* or *Aſa* compleated.

This is the common Way of reaping hitherto uſed in the Mountains near *Diſguun*, *viz.* in three Excurſions to the Hills they gather the *Sjür Aſa* eight Times, and the *Piſpaas* three Times, from each Root. But 'tis to be remembered that the larger Roots, *i. e.* ſuch as are above twenty Years old, and are found in the furtheſt Parts of the Mountains, whither they cannot climb without great Difficulty, are not ſo ſoon done withal; but they will yield the *Aſa Piſpaas* four or five Times, and the *Aſa Sjür* ſo much oftener in Proportion. So that theſe Roots are not compleatly drained of their Juice till *September*. However in theſe Mountains few Roots are found above ten Years old, and none ever exceed twenty. For the great Price that *Aſa* hath bore for many Years together, made the Reapers gather all the Roots that ever they could find, ſo that there has not of late been Time enough allow'd for any to arrive at ſo great an Age and Bulk. The Roots being drain'd of their Moiſture and left uncovered do every one of them putrify: Tho' one of the Reapers affirmed to me upon his own Experience, that if they were covered with Earth they would grow again; but in this Point none of the reſt agreed with him.

After ſuch a particular Deſcription of the Plant as this, and the Manner of gathering the Juice, there will be little need of adding any thing more on thoſe Heads from antient Writers; few of whom had ever ſeen the *Silphium* Plant, and moſt of them took what they delivered on the Authority of Fame and Credit of others: Whereas here we have the Authority of a Man who lived and converſed in its native Countrey and amongſt the People who themſelves gathered and prepared it, till it became a Gum fit to be ſent over into foreign Parts.

Kempfer, who was himſelf a Phyſician, ſeems either to take it for granted that every one knew its Excellencies and ſovereign Virtues, or elſe cared not to explain what he thought ſhould be kept a Myſtery in the *re medicâ*; otherwiſe he would have given us more particular Accounts of the Opinions, which both Antients and Moderns have entertained of the Virtues of the *Silphium*, and its wonderful and ſurprizing Effects, both inwardly taken, and outwardly apply'd.

To ſupply which Defect, without multiplying Authorities and Teſtimonies from *Dioſcorides*, *Theophraſtus*, *&c.* I ſhall refer the Reader to the Quotations in the Margin from *Galen* [*] and *Pliny* [†], as being the Sum of what the others [‡] have ſaid; and content my ſelf to obſerve farther here, that this Plant was formerly ſo highly eſteemed for its delicate and rich Flavour in Sauces and Sallads, and ſo prized for its ſovereign Uſes in Phyſick, that it was dedicated to *Apollo*, and ordered to be hung up in his Temple at *Delphi:* And *Pliny* || himſelf tells us of one ſingle Plant brought to the Emperor *Nero*, as an extraordinary Preſent; and withal, that this Gum was then ſo greatly valued, that the *Romans* treaſured up a conſiderable Quantity of it, till *Julius Cæſar* came and robb'd the Treaſury, and with the Gold and Silver took this alſo away as a Thing of rare and extraordinary Worth. Nay, we are told * that the *Cyreneans* honoured the very Figure of it, by ſtamping it on the Reverſe of their Coin; and that when they had a Mind to ſet forth the Excellence and ſuperlative Virtue of any Thing, they would ſay proverbially it was as good as Βάττου Σίλφιον.

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[*] Omnes Silphii partes flatulentæ magis ſunt Efficatiæ, & proinde concoctu difficiles: Foris tamen impoſitæ Corpori efficaciores, & omnium potiſſimum liquor admodum trahentem facultatem obtinens; attamen Excreſcentias imminuendi & liquandi vim quandam propter jam dictam temperiem habentem. Liquor Cyrenaicus quidem omnes & caliditate & tenuitate exuperat & proinde etiam omnium maximè diſcutit. *Galen.*

[†] Uſus Silphii in Medicinâ. Nam folia ad expurgandas Vulvas pellendoſque emortuos partus decoquuntur in Vino albo odorato, ut bibatur menſura acetabuli à Balneis. Radix prodeſt arteriis exaſperatis, & collectionibus ſanguinis illinitur: Sed in cibis concoquitur ægrè. Inflationes facit & ructus; Urinæ quoque noxia. Sugillatis cum vino & oleo amiciſſima, & cum cera Stumis. Verrucæ ſedis crebriore ejus ſuffitu cadunt. Laſer ejus (inter eximia Naturæ dona numeratum) per ſe algores excalfacit. Potum nervorum vitia extenuat. Fœminis datur in vino; & lanis mollibus admovetur vulvæ ad menſes ciendos; pedum clavos circum ſcarificatos ferro mixtum ceræ extrahit; Urinam ciet ciceris magnitudine dilutum. Andreas ſpondet copioſius ſumptum, nec Inflationes facere & Concoctioni plurimum conferre ſenibus & fœminis: Item hyeme quàm æſtare utilius; veruntamen aquam bibentibus, cavendumque ne qua intus ſit exulceratio. Ab ægritudine recreationi efficax in cibo; tempeſtivè enim datum cauterii vim obtinet: Aſſuetis etiam utilius quàm expertibus. Ad extera corporum indubitatas Confeſſiones habet. Venena telorum & ſerpentium extinguit potum; ex aqua vulneribus his circumlinitur; Scorpionum tantùm plagis ex oleo; Ulceribus verò non matureſcentibus cum farina hordeacea vel fico ſicca; Carbunculis cum ruta vel cum melle vel per ſe viſco ſuperlitum ut hæreat; ſic & ad Canis morſus. Excreſcentibus circa ſedem cum tegmine punici mali ex aceto decoctum. Clavis pedum, qui vulgò morticini appellantur, nitro mixto, antè ſubactum. Carnes replet cum vino & croco aut pipere aut murium fimo & aceto. Perniones ex vino fovet, & ex oleo coctum imponitur. Sic & callo. Clavis pedum ſuperfaſis præcipuæ utilitatis contra aquas malas, peſtilentes tractus, vel dies. In tuſſi, uva, fellis veteri ſuffuſione, hydropiſi, raucitatibus. Confeſtim enim purgat fauces vocemque reddit. Podagras in Spongia dilutum poſca lenit. Pleuriticis in Sorbitione vinum poturis datur; contractionibus opiſthotonicis, ciceris magnitudine cerâ circumlitum. In Angina gargarizatur Anhelatoribus, & in tuſſi vetuſtâ cum porro ex aceto datur: æque ex aceto his qui coagulum lactis ſorbuerint. Præcordiorum vitiis ſyntecticis comitialibus in vino, in aqua mulſa linguæ paralyſi. Coxendicibus & Lumborum doloribus cum decocto melle illinitur. Non cenſuerim, quod Authores ſuadent, cavernis dentium in dolore inditum cerâ includi, magno Experimento hominis, qui ſe eâ de causâ præcipitavit ex alto; quippe tauros inflammat naribus illitis, ſerpentes avidiſſimas vini admixtum rumpit; ideo nec inungi ſuaſerim cum Attico melle, licet præcipiant. Quas habeat utilitates admixtum aliis immenſum eſt referre, & nos ſimplicia tractamus, quoniam in his naturam eſſe apparet, in illis conjecturam ſæpius fallacem, nulli ſatis cuſtodita in mixturis concordia naturæ ac repugnantia. Plin. Nat. Hiſt. l. 22. cap. 23.

[‡] Vide Theophraſt. & Dioſcoridem, qui paſſim Virtutes eaſdem & quidem majores Silphio aſcribunt. *And among the more Modern, ſee the following Account given of it by* Fuchſius *a* German *Phyſician, who tells us the Plant grew commonly in his Countrey.* Laſerpitium noſtrum ex traditione recentiorum unicè Venenis adverſatur. Item Peſtilentiæ populariter graſſantis arcet contagia. Lentitiam pituitoſorum humorum incidit ac diſcutit; quapropter tuſſi quam frigus attulit, medetur. Craſſa, quæ in thoraca coeunt, diſcutit. Coloris corporis bonitatem iis, qui eo veſcuntur, efficit. Concretum in corpore lac & ſanguinem reſolvit. Stomachum eſu corroborat. Pituitam ventriculi dejicit, & elangueſcentem appetentiam invitat. Menſes & urinam ciet. Rabioſi Canis morſu aut Serpentis ictu liberat, ſi contrita folia vulneri indantur. Hypochondriorum vitiis auxiliatur; item Lumborum doloribus. Carbunculos cum polenta tritum & impoſitum ſanat. Cum vino potum rigores diſcutit. Herba ipſa in vino & aqua cocta vulnera interna glutinat. Et, in ſumma, omnia quæ Angelica vocata Herba, & majori efficacia, poteſt. Ut hinc etiam conſtet Oſteritium à noſtris nominatum eaſdem habere quas veterum Laſerpitium, inefficaciores tamen, facultates. Quare, cùm metus ſit ne Laſerpitium adulterinum, aut ſaltem non optimum ad nos afferatur, præſtat noſtro uti, quod ſcilicet exiguâ admodum pecuniâ comparari poſſit, & viribus ſatis efficax ſit; nam eadem quæ Dioſcorides & Plinius Laſerpitio aſſignant, recentiorum teſtimonio præſtare valet. *N. B.* Laſerpitium Germanicum in horto divi Germani Pratenſis Pariſienſis eſt multum. Fuchſii Hiſt. Stirpium, cap. 292. Anno 1549. Nullum Medicamentum ſimplex per totam Indiam majore eſt in uſu quam Aſa Fœtida, tum in Medicamentis, tum in condiendis cibis (ut poſt Garciam teſtatur Bontius) ut propter hanc cauſam una ſit cum Opio ex præcipuis Mercibus quæ per Indiam diſtrahuntur. Solent Baneanes & omnes Gentiles provinciæ Cambaiæ, qui à carnium eſu abſtinent, Aſam juſculis & oleribus ſuis commiſcere, confricato primùm ex eâ lebete, nec alio condimento

Could we have it brought to us without thoſe foul Mixtures of Earth, Clay or Meal, too often out of Covetouſneſs incorporated with it, I doubt not at all, notwithſtanding the Prejudices entertained againſt it, but it would ſoon recover its antient and eſtabliſhed Reputation, which muſt have been founded upon ſome real and intrinſick Worth; ſince beſides its medicinal Virtues occaſionally made uſe of, as far as appears, they conſtantly mixt it with all their Sauces and Spoon-meat, as a wonderful Reſtorer of loſt Appetite, a Sweetener of the Blood, and a Strengthener of the Stomach and maſculine Vigour.

Notwithſtanding what the learned Doctor above hath ſaid with Relation to this Plant, that it refuſeth Art; and that all Accounts both antient and modern declare it uncapable of removing, or of Culture, I am yet ſtill far from being diſcouraged in my Hopes of getting ſome Time or other the noble *Silphium* amongſt us alive: For I am perſuaded, if ſome curious Perſons of the *Eaſt-India* Company would but ſearch and bring, we might ſoon be poſſeſſed of a better Treaſure than is perhaps known at preſent in the whole *Re Medicâ*. As to its Culture, when we have once got it, (either in the Seed or Root) I have no Difficulty in my Mind about *that*, notwithſtanding what is generally thought to be the Opinion of both Antients and Moderns. A few Years ſince, who would have thought (for it was thought impoſſible) that we could have brought the Fruit of the *Pine-Apple* to Perfection in *England?* And have we not now Oranges, Lemons, Pomgranates, Coffee, Capers, and what not, familiar amongſt us? Beſide, a ſmall Quantity, one Day's Allowance for the *Perſian* King's Table, is ſufficient to do Wonders in Phyſick. And we may well be content with that, till ſuch Time as innocent Luxury, or a more elegant Way of living calls for a farther Demand, and makes the Effect of a laborious Diligence become almoſt neceſſary for the Health and Pleaſure of Mankind.

We know the Art of removing *Exotics* and tender Plants was almoſt unknown in *Pliny*'s Time; and I remember the *Roman* Soldiers and o-

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utuntur omnibus in cibis. Multa in hanc rem vide apud Garciam. Utuntur eâ medicamenti loco ad Appetitum proſtratum excitandum, Ventriculum roborandum, flatus diſcutiendos, Venerem irritandam. Apud nos in Europâ præcipuus ejus uſus eſt internus in Suffocatione uterinâ, peripneumoniâ & vulneribus. Extrinſececus in tumido Liene & Uteri Suffocatione panentio (cum allio ovi alb. ſuſcepto) N. Siquis Epilepſiæ obnoxius ſenſerit ſuffitum ex Aſa Fœtida, & Cornu Caprino paroxyſmo actutum corripitur. Idem Raii Hiſt. Plant l. 32. Tom. 2.

|| Plin. Nat. Hiſt. lib 19. cap. 3

* Spanheim, de Uſu & Præſt. Numiſ. Diſſert. 4.

thers were poſſeſs'd with a Notion that *Grapes* would not remove from *Italy* into the South Parts of *France:* But that the *Greeks* and *Romans* could not, or durſt not attempt to remove a Vine, is no Argument that *we* cannot do it even with Eaſe and Pleaſure. 'Tis a late Invention of the *Dutch* to carry *Acrons* to the *Cape of Good Hope.* And tho' forty Years ago none would have believed that the *Engliſh* Oak would have covered the *African* Mountains; yet now (it ſeems) they flouriſh there, as it were the Infant-Strength of ſome future Empire growing up to Manhood.

Beſides again. Hath not Nature formed and deſigned the *Silphium* Plant for Propagation and Increaſe, by throwing up a tall Stalk, whereon is formed a ferulaceous Head full of Seeds flat and oval? And is it not from theſe Seeds, ſcattered about by the Winds, that the infant Plants themſelves ariſe and are increaſed, when they happen to fall into a ſuitable Soil and Situation, as a proper Matrix to nouriſh and give them Life? 'Tis then but following Nature, and imitating her Directions, and the Work is done.

Indeed *Theophraſtus* * and *Pliny* † both ſpeak of the *Silphium*, as a Plant that refuſeth Culture, and of a wild untractable Nature; but even this they mention as a Thing of *Hear-ſay*, not to be depended upon: For that there were others ‡ that deny'd this, and affirmed the contrary even in thoſe Days, ſaying it was made much better by Tillage. But whatſoever the Antients mean by its *refuſing Culture*, and being of a *wild Nature*, there is no manner of Queſtion to be made, but that it is to be raiſed from the Seed, as every Thing which bears Seed may, and as itſelf is raiſed in its native Countrey, by the Seed's being carried about by the Wind And indeed by repeated Accounts we have had from modern Authors ||, it hath actually been raiſed from the Seed, brought into many Parts of *Europe*, and is at this Day growing in *Italy*, *Germany*, and in *France*; tho' the ſame Authors own that it is not of ſo powerful a Nature; which in all Probability is owing to nothing but the Want of Sun: And yet this Defect is to be eaſily ſupply'd by Art; as we ſee it is every Day done to very good Purpoſe with Reſpect to all other tender Exotics.

The chief Reaſon why this Endeavour of raiſing the Plant at home ſhould be purſued, is, that we might at all Times have the Command of the green Leaves and Stalks, which are ſo highly extolled as ſovereign Remedies, outwardly applyed, by way of Poltice, in all violent Pains; ſuch as Gout, Sciatica, and Rheumatiſm.

And then again; If we would conſult the Palates of thoſe, who underſtand good Eating, and would furniſh them with Meats of the moſt ſweet and delicious Flavour, I ſee nothing to hinder, but that if any Quantity of Seed could be procured, we might ſow whole Fields of it, as we do *Clover*, with a View only of fattening and improving our Sheep; nay, and rendering them ſound and wholſome when they are found to be otherwiſe. That theſe are the Properties of the *Silphium* Plants in their native Countrey, and that this is the common Practice of the

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* Ἴδιον δὲ τὸ φεύγειν τὴν ἐργαζομένην, &c. Theophr. l. 6. c. 3.

† Rem feram ac contumacem, & ſi coleretur in deſerta fugientem, Plin. l. 19. c. 3.

‡ *See* Theophr. *Chap. above.*

|| Fuchſius, cap. de Laſerpitio. Lovel, Garcias, Ray, &c.

Farmers there, we have the undoubted Authorities of *Theophraſtus* and *Pliny* *, who both report the ſtrange Effects it hath on Cattle, eſpecially Sheep, making them preſently fat, and the Mutton to have a wonderful pleaſant Taſte; and withal, it generally reſtores thoſe that are weak and unſound.

The Objection that naturally offers is, that our Climate is too cold for it, and therefore that it would be loſt Labour. But this Objection in its utmoſt Strength, can only affect our *Winters*, and not our *Summers:* And then if the Seed, like that of Barley, Oats and Peaſe, be ſown in the Spring, with a View only of having it eaten up in the Summer with Sheep, in Order to have a greater Delicacy than can be had off *Bagſhot-Heath*; who would not lay aſide his *Clover*, and introduce the *Silphium?* At leaſt, who would not try in ſmall Quantities as an Eſſay for Treaſures and future Riches? Neither is it certain that our Winters will kill the Plant. We have Inſtances of many Plants from foreign Parts in the ſame Latitude with *Perſia* or *Cyrene*, that are found to bear our Winters pretty well, even beyond Expectation; or if ſome of them are killed to the Ground, we find with Pleaſure they have generally a Reſurrection from the Root, if large or extended. And then if a Field of *Silphium*, eaten to the Ground in Summer with fat Sheep, ſhall afterwards afford a Succeſſion of annual Crops, and be as laſting as *Saintfoin*, and of infinitely greater Virtues, what an Improvement in Husbandry would here be introduced amongſt us, beſides a Treaſury of one of the beſt Medicines both for Man and Beaſt?

Theſe Things I offer, not as airy Suppoſitions, but as probable Speculations; being ſanguine enough to hope that one Time or other, by the Means of ſome enterprizing Genius, the *Aſa* or *Silphium* Plant, ſo highly extolled both by Antients and Moderns for its wonderful Virtues, may be introduced *alive* amongſt us; that we may every Day more and more experience that Bleſſing and Bounty which the great Author of Nature intended for the univerſal Comfort and Pleaſure of Mankind.

I hope I need not make any Apology for being thus particular on a Plant ſo uſeful, and ſo little underſtood. And although it is at preſent an Exotic (with which I am not now concerned;) yet becauſe it is ſo uſeful an Ingredient in a Sallad, and being not out of Hopes to naturalize it amongſt us, I was willing to do it that Juſtice, and give it that Precedence, which its Virtue and ſingular Nature might juſtly require.

Thus I have particularly deſcribed the Nature and Virtue of every ſingle Plant fit for the Compoſition of a Sallad, that every one may mix and ſort them ſo as may be moſt agreeable to his own Palate. The great Art in the proper Mixture lieth in rightly conſidering the peculiar *Reliſh* of the ſeveral Sallad Herbs, *viz.* which are moſt hot and biting; as *Creſſes*, *Muſtard*, *Sellery*, *Scurvygraſs*, *Terragon*, &c. and then which are more cool and inſipid; as *Spinage*, *Corn Sallad*, *Lettuce*, *Endive* and *Purſlain*, and the like. For after this Knowledge is once attained from the aforegoing Deſcriptions, it will be no difficult matter to compoſe a well reliſhed Sallad, where the *biting Taſte* of one Kind may not overpower the *Sweetneſs* of the reſt; diſcreetly making uſe of ſome of the more inſipid Sorts to qualifie the Heat and Pungency of others; ſtill ſuppoſing that the diſcreet-Gatherer hath a Regard to the Seaſon of the Year, and then every Sallad may be made, not only agreeable to the *Taſte*, but ſafe and wholeſome to the *Body*.

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* Ἅμα μὲν οὖν τῷ ἦρι τὸ μάσπετον τοῦτο ἀφίησιν· ὃ καθαίρει τὰ πρόβατα καὶ παχύνει σφόδρα, καὶ τὰ κρέα θαυμαστὰ ποιεῖ τῇ ἡδονῇ. Teophr. lib. 6. cap. 3. Hujus folia Maſpetum vocabant; veſci pecora ſolita primoque purgari, mox pingueſcere, carne mirabilem in modum, jucunda. *Again*; Si quando incidit pecus in ſpem naſcentis, hoc deprehenditur ſigno, ove cùm comederit dormiente protinùs, Capra Sternutante.——Pecora ægra ſanari, aut protinus mori, quod in paucis accidere. Plin. Nat. Hiſt. Lib 19. c. 3. paſsim.

That ſeems therefore to be an extravagant Fanſy which ſome have entertained; *That a Fool is as fit to be a Gatherer of a Sallad as a wiſer Man.* And the Miſtake is founded upon this Imagination, as if any thing that is but green, young and tender is a fit Ingredient for a Sallad in the Spring. Whereas Experience ſhews how many fatal Miſtakes have been committed by thoſe who took the deadly *Hemlocks* and *Aconits* for *Parſley* and *Parſnips*; *Dogs Mercury* inſtead of *Spinage*; *Cow-weed* for *Chervil*, and *Thrapſia* for *Fennel.* Theſe miſtakes have ſometimes proved immediate Death, and they muſt alway prove hurtful to the Brain, and unwholſome to the Body. So highly neceſſary is it, that a diſcreet and skilfull Choice be made, not from *Names*, but from the *Nature* of Plants in our own Climate rightly underſtood: And it is certainly the Intereſt of Mankind, that all Perſons ſhould be cautioned of being too bold in adventuring upon any *unknown* or *uncertain* Herbs and Plants, to the Prejudice of their Health, or the Ruin of their Conſtitution.

I have already obſerved how neceſſary it is, that in the mixing of a Sallad, every Sort ſhould come in to bear its Part, without being overpowered by another of a ſtronger Taſte, that the native Virtue and true Reliſh of *any* may not be wholly loſt; that there may be ſomething the ſame Analogy in *Taſtes*, as there is in muſical *Notes*; nothing harſh or grating; but that the Whole may prove an agreeable *Compoſition.* Thus *Damoxenus* introduceth a comical *Cook*, who when he was ask'd what Harmony there was in Meats? Anſwered; *The very ſame that a Diateſſaron, Diapente, and Diapaſon have one to another in a Conſort of Muſick. Athenæus* makes a very diverting Scene of it; * and the Application ſeems to be very juſt.

From what hath been ſaid, it ſufficiently appears that Wiſdom and Judgment are neceſſary Qualifications for a Compoſer of a Sallad. And to be an exact Critick indeed, he ſhould be skilled in the Degrees, Terms, and various Species of Taſtes, according to a Scheme ſet down in the Tables of the learned Dr. *Grew*, to which the Curious are directed. Lect. 6. *Chap.* 2,3.

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* Athen. Lib. 23. Horace *ſeems to have much the ſame Notion.* Sat. Lib. 2.

> Nec ſibi cœnarum quivis temerè arroget artem,
> Non prius exactâ tenui ratione ſaporum.

And our elegant Milton *introduces* Eve *dreſſing a Sallad, in Parad. loſt.*

> *What Choice to chuſe for Delicacy beſt,*
> *What Order ſo contrived as not to mix*
> *Taſtes not well joined, inelegant, but bring*
> *Taſte after Taſte upheld by kindlieſt Change.*

But Mr. *Evelyn* ſomething more to our preſent Purpoſe, beſides giving us a Table of Herbs proper for every Month in the Year, with their Proportions, hath laid down nine Rules for preparatory Ingredients, which I ſhall but juſt mention, and refer the Reader (if he wants them) to his fuller Inſtructions and Tables †.

(1) Preparatory to the dreſſing, let your herby Ingredients be exquiſitely cull'd and cleanſed of all Worm-eaten, ſpotted or vitiated Leaves, and theſe rather diſcreetly *ſprinkled*, than overmuch *ſobb'd* with Spring Water; after which, ſwing them gently in a clean Napkin, till they are fit to receive the *Intinctus* following. *viz.* (2) Good Oil, an Ingredient ſo indiſpenſably and highly neceſſary, as to have obtained the Name *Cibarium* (with us *Sallad-Oil*) that it be not high coloured nor yellow; but rather of a pallid *Olive Green*, without Smell, and no otherwiſe affecting the Tongue, but as it is ſmooth, light and pleaſant. (3) That the Vinegar and other liquid Acids be perfectly clear and without Corruption, drawn and diſtilled from Wine, and ſome think ſtill improved, if infuſed with Clove Gilliflowers, Elder, Roſes, or Naſtertium. (4) That the Salt be of the brighteſt Grey-Salt dried and contuſed, as being then the leaſt corroſive. Some indeed are apt to affect *Sugar*, but what we find to be moſt eſteemed by learned Palates is the *grateful Saline acid Point*. Some recommend the eſſential Salts and Spirits of the moſt ſanative Vegetables, as the moſt healing, cooling, generous, and refreſhing Cordial. But ſince the learned differ in this Point, and queſtion whether all the fixt Salts made the common Way be any whit better than our common Salt, it may ſuffice that the Sallad Salt be the the beſt ordinary Sort, bright, dry and without Clammineſs. (5) That the Muſtard (another noble Ingredient) be of the beſt *Tewksbury. N. B.* The Muſtard growing, and there by a peculiar Art freed from the bitter brown Husk and made into fine Powder, at and about *Durham* much to be preferred, it being from all Parts ſent for and much admired. They preſerve the Flower and Duſt of the bruiſed Seed, which reſembles *Brazil* Snuff in a well ſtopt Glaſs, to temper it with Water and have it freſh when they pleaſe, it being fit to eat a few Minutes after 'tis mixt with Water. But what is yet by ſome eſteemed beyond all theſe is compoſed of the dried Seed of the *Indian Naſturtium* reduced to Powder, and mixt with a little Leaven, and ſo from Time to Time made freſh; as indeed all other Muſtard ſhould be. (6) That the Pepper, black or white, be not bruiſed to too ſmall a Duſt, which is reckoned prejudicial. The Root of the *minor Pimpinella* or ſmall *Burnet Saxifrage*, being dried, is by ſome extolled beyond all other Peppers and more wholeſome. The *German* Houſewifes have a Way of mingling *Saffron* with Honey made up into Balls, which when dried, they afterwards reduce to Powder, and ſprinkle it over their Sallads for a noble Cordial. The *Spaniards* and *Italians* alſo make great Uſe of this Flower, mingling its golden Tincture with almoſt every thing they eat: But we are apt to think it too prevalent in our Sallads. (7) That there be the Yolks of new laid Eggs boiled moderately hard to be mingled with the Muſtard, Oil, and Vinegar. (8) (According to the Super-curious) that the Knife with which the Sallad Herbs are cut, eſpecially *Oranges*, *Lemons*, be of

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† Evelyn. Acet. *pag.* 96. &c.

Silver and by no means of *Steel,* which all Acids are apt to corrode, and retain a metalic Reliſh of. (Laſtly) That the Sallad Diſhes be either *China* or *Delf* Ware, *Pewter* or even *Silver*, not at all ſo well agreeing with Oil and Vinegar, which leave their ſeveral Tinctures. The liquid Vehicles may be mixt firſt in a ſeparate Plate; and then with a Fork and Spoon kept continually ſtirred, all the Furniture may be equally moiſtened. But ſome, who are Husbands of their Oil, pour on at firſt the Oil alone, as more apt to communicate and diffuſe its Slipperineſs, than when it is mingled with the Acids.

The Sallad-dreſſer being now furniſhed with proper Ingredients and ſufficiently inſtructed in the Virtues, Nature and Property of every Herb, I may well ſuppoſe him in Time to become an accompliſhed Artiſt, having always Wiſdom and Diſcretion *(pro hic & nunc)* to know what to chuſe and what to refuſe: But if he wants further Aſſiſtance, let him have recourſe to Mr. *Evelyn*'s *Table* and *Liſt*, calculated for all Seaſons.

CHAP. VII.

Of Pot and Aromatick Herbs.

THERE are yet ſome *Aromatick* Herbs commonly uſed in the Kitchen, which may well deſerve our Notice. For though their Culture be not difficult, their Nature, Property and Uſe, may not poſſibly be ſo well underſtood.

Roſemary.
Lavender.

I ſhall begin with two very uſeful and excellent Plants. *Roſemary* and *Lavender*, both great *Cephalicks*, and ſovereignly uſeful for the Memory, Sight, and Nerves. They are both beautiful and laſting *Evergreens*; love a dry, warm and ſandy Soil; for too much Wet in the Winter is apt to deſtroy them. They are eaſily raiſed from Slips of the laſt Year planted in *April.* Of *Roſemary* there are ſeveral Sorts, the *Common*, the *broad Leav'd*, the *gilt* with *yellow*, and the *Silver ſtrip'd:* Beſide theſe there is the *double flow'red*, whoſe Leaves are bigger, its Stalks ſtiffer and bearing many double pale blue Flowers. The ſtrip'd Sorts are moſt tender; but the common and broad-leaved are hardy enough to reſiſt our ordinary Winters, and to be cut into any Form, provided they be not too much expoſed to North Winds. *Lavender*, to ſay nothing of its great Uſe in *diſtilling*, makes a fine Edging in large Gardens, provided it be frequently cut: But for the Sake of its Flowers, which are much uſed by the Apothecaries, there ought to be a Plantation of it apart; for were the Edgings ſuffered to flower, a great Part of their Beauty would be loſt. There is another Plant called *Lavender Cotton*, propagated like the other, and makes alſo a very beautiful Edging for large Walks.

Thyme.

Thyme is another *aromatick* Herb, very uſeful both in the Garden and the Kitchen; for it ſhould be always at the Cook's right Hand, and every one knows it makes the prettieſt Borders along the Sides of Gravel Walks, and will laſt ſeveral Years, if it be frequently and ſeaſonably, after

ter Rain, clipt as it ought. But becauſe it is eaſily raiſed both from Seed and Cuttings, it ſhould be renewed once in four or five Years, ſtill remembering at every new Plantation to renew the Soil. There are ſeveral Sorts of it, and ſome of them prettily and differently variegated, which add to their Beauty in Borders. There is a *Maſtick* Thyme much admired for its Smell in Poſeys; as alſo the *Marum Syriacum*, which gives a very refreſhing Pungency to the Noſe, when rub'd betwixt the Thumb and the Finger, and this gives it a Place in Pots even in the Ladies Chambers. Whether the Smell of it cauſes an Averſion or Frenzy in Cats cannot certainly be determined; but they alway (if they can come at it) rub and tear it, till they quite deſtroy it; and therefore not only to prevent this Miſchief, but to preſerve it from the Severity of the Winter, it ſhould be ſet in Pots and guarded with Wire Lattice. Some uphold the Pots with Iron Hoops driven into a South Wall.

Hyſop. *Hyſop* is alſo a Plant both for *diſtilling* and Borders, and may be raiſed either from Seed or Slips in *March* and *April.* There is a Sort of it prettily variegated, which adds to its Beauty ſet for Borders.

Rhue. We have two Sorts of *Rhue*, the one variegated with a cream Colour, the other of a pale green. Both are excellent for Borders, if well clipt. It is eaſily propagated by Slips in any wet Seaſon. Its ſtrong Smell is ſuppoſed to be a good Guard againſt Infection; but perhaps it may be dangerous to truſt too much to its Power and Influence.

Tanſie. *Tanſie* is encreaſed by parting the Roots in the Spring; and hath been formerly in much eſteem for Kitchen Uſe; but being of a hot and domineering Reliſh, it is but little uſed, except in a Dainty which itſelf gives a Name to. There is a Sort of it which is prettily ſtrip'd. But Mr. *Bradley* is ſo in Love with this Plant, that he thinks there ought always to be ſome of it kept dry in the Winter; particularly for the Uſe of thoſe who fear the Gout in the Stomach: And becauſe I would always help to propagate *Good Nature*; *his Noſtrum* in the Uſe of *Tanſie* is this. " Boil half a Handful of this Herb in half a " Pint of ſtrong white *Wine*; ſo drink the Decoction as hot as poſ- " ſible. " This he ſaith, he always found would remove the Pain in a Quarter of an Hour.

Savory. There is a Summer and a Winter *Savory.* The firſt is an annual Plant raiſed by Seed; the other is perpetual, increaſed by Seeds or Slips and will endure a hard Winter. This is another Kitchen Herb grown out of date by Reaſon of its too rank Flavour.

Marjoram We have alſo two Sorts of *Marjoram*; the *one* called Winter-ſweet or Pot-*Marjoram*, which is ſometimes prettily ſtrip'd with yellow, and will laſt three or four Years, well enduring the Winter Cold; the *other* is the annual *Sweet Marjoram*, raiſed either in a Hot-bed or in a fine warm Soil in *April*; this is accounted a very agreeable Perfume in a Poſey of Flowers, and is not leſs uſeful in the Kitchen all the Year, even when dry'd in the Winter. The firſt is eaſily propagated from Slips in the Spring or in any moiſt Seaſon.

Penne-royal and Camomile *Penneroyal* and *Camomile* are uſeful Plants, chiefly in phyſical Preparations: But as there is a conſtant Demand for them, they ſhould not be wanting in the Garden, where they will grow almoſt in any Soil; but chiefly in moiſt and ſhady Places, and are propagated from Slips.

Angelica. *Angelica* is a large Plant, running up with a Stalk five or ſix Foot high, and is raiſed from Seeds ſown in a moiſt and rich Ground. In

July

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July and *Auguſt* it puts forth large Tufts of beautiful Flowers; but where the Seeds are left to ripen, there the Plant commonly dies. But if it is frequently cut, it will laſt good for ſeveral Years, and is of great Uſe, eſpecially to Confectioners.

Carduus. The *Carduus* ſown in Gardens, for its Virtue in phyſical Uſes, hath obtained the Name of *Benedictus*, or the *Bleſſed Thiſtle.* The Demand for it is ſo frequent for vomiting, *&c.* that it ſhould be annually ſowed, either in the Autumn or Spring. The firſt Seaſon produceth the beſt and largeſt Plants.

Clary, *Wormwood*, and *Dill*, are ſo well known, and ſo eaſily raiſed, that it is ſufficient only to mention them as uſeful in a Garden. However it may not be amiſs to ſay, that both the *Buſh* and the *Sweet Baſil* are pretty beautiful odoriferous Plants much admired by the Ladies, and therefore ſhould be propagated for the Sake of their Beauty when ſet in Pots in their Chambers, and for the Sweetneſs of their Leaves. They ſhould *both* be ſown in Hot-Beds to accelerate their Growth, and complete their Size, and afterwards tranſplanted into Pots, or other Parts of the Garden, where Sweetneſs and Ornament is moſt required. *Baſil.*

CHAP. VIII.

Of the Nature, Properties, and great Advantages of Untried *Earth, both in the* Fruit *and the* Kitchen *Garden.*

HAving hitherto treated fully and particularly both of the *Fruit* and *Kitchen Garden*; ſhewing the beſt Methods of raiſing, planting, and propagating of Fruit Trees, and of ſowing and encreaſing all Sorts of *Legumes*, Herbs and Plants, I might ſtill be thought defective, if I did not recommend ſome one particular Sort of Earth, or Compoſt, wherein to plant and ſow Trees and Herbs, as what might prove of moſt general Advantage to the Planter and Sower, and anſwer the deſired End and Purpoſe of Health and Salubrity to Trees, and a true Reliſh and Wholſomeneſs to Herbs and Fruit. This I have already in a former Treatiſe adviſed and recommended by the Name of *Untried Earth*, and withal directed where to find it. *Gent. Recreat.* But foraſmuch as what I have there ſaid is thought too general, and the World is not yet ſufficiently apprized of its Excellence and Virtue, but are ſtill loading in Dung amongſt their Fruit Trees and Plants, to the great Hurt and Corruption of both, and to the vitiating the natural Juices of Fruits and Herbs, with the unwholſome and indigeſted Steams ariſing from Dung of all Kinds, I ſhall think my ſelf obliged to ſay ſomething more particularly about the Nature and Virtues of *Untried Earth.*

By *Untried Earth*, I would be underſtood to mean all ſuch warm, mellow, rich Soil, as lieth next and underneath the Surface of ſome *Meadow*, *Paſture* or *Waſte*, where Cattle have been of long Time wont to lie at their Eaſe, and where neither Plough nor Spade have ever, or at leaſt not within the Memory of Man, been uſed: And this, if it be rightly and diſcreetly choſen, commonly holds good from ſix to ten or twelve Inches deep after the Turf is pared off, and ſometimes a great deal more. Some have made it a Difficulty, as if this was hard to be found in any Quantity. Whereas I have never yet come into that Lordſhip or Countrey, (whether open Field or encloſed) but I could always find out a ſufficient Quantity to ſupply the Wants of the curious; for the incurious are *moſt* and *many*. In many Places there is a large green Turf or open Waſte in the Middle of a Pariſh; and this ſeldom fails to be good, being enriched from Time to Time with the Dung of Cattle, Geeſe and other Fowl, and furniſhed with large Quantities of earthy Particles fit for Vegetation, becauſe not drawn forth by the Roots of various Vegetables.

In moſt Places there is ſome River, Rivulet, or Brook, which runs through Flats, Meadows, or low Grounds: And *theſe* are commonly every Winter overflowed, and therefore receive Abundance of rich new earthy Matter driven down from the upper Grounds; and ſo obtain a conſtant Addition of Riches, and never have any exhauſted, but what the Roots of Graſs exhauſt, which ſeldom run deeper than two Inches.

Sometimes even in the Highways there are great Opens of old Sward, under which is found excellent *Untried Earth*, fit for the Purpoſes we are ſpeaking of. And I think all, both open Fields and Encloſures, muſt have conſiderable Quantities of old Soil never turned up, which either by Right or Favour may be made uſe of, without in the leaſt injuring the Soil, the pared Turf being laid down in the Place again. Wherever I have come I have never yet found much Difficulty to procure, one Way or other, enough of this Earth to ſerve the Purpoſes both of my ſelf and Friends. The greateſt Difficulty hath been where the Countrey abounds with *Clay* lying very near the Surface, and the Soil to be improv'd is *Clay* too: But even in this Caſe, and amongſt the worſt of Clays at *Yelvertoft*, I always found, one where or other, ſome mix'd loamy Soil, made good and rich by conſtant Superinductions of Sands driven down by Floods.

Having thus told you what *Untried Earth* is, and where to find it, I would fain make ſome ſuch Impreſſion upon the Mind and Judgment, and Reaſon, (where likewiſe all Impreſſions relating to Morality are only to be made) that when an *old* Way, introduced by Cuſtom and Habit, is proved to be *wrong* and *falſe*, a *new* and *better* may take place, more agreeable to good Senſe and later Experience. To this Purpoſe I would firſt obſerve to you from my own Experience, that from the Uſe of *Untried Earth* I have ſeen moſt ſurprizing Productions, even beyond any artificial Amendments, both in the *Fruit* and *Kitchen Garden*. And although this may ſeem romantick and ſtrange to them who have not tried it; yet ſure I am, and I lay an Emphaſis upon it, that no Sort of Compoſition made with Art, can be brought (to *equal* I was going to ſay, but for certain) to *exceed* in all Reſpects this *Untried Earth*. For if the choiceſt and tendereſt Fruit Trees be planted in this Earth, they preſently diſcover an uncommon Healthfulneſs and Vigour. If any of the tendereſt Sorts of *Annuals* be ſown in this Earth, if it be diſcreetly choſen, you may ſoon perceive by their flouriſhing Looks and Colour, that they *like* the Soil. Nay even *Melons* and *Cucumbers*, (a bold Word to ſpeak, you'll ſay) need no other Compoſt or Riches to bring them to their Maturity and Richneſs of Taſte. Our Want of Sun indeed puts us under a Neceſſity of accelerating their Growth by adding artificial Heats from *long Dung*; but that Conſideration comes not into any Part of our preſent reaſoning; becauſe the Roots of Plants are not ſuppoſed to get (and it is granted they do not get) any Subſtance or Vigour from thence, but *Heat* alone; whereby the earthy Particles are put in Motion and made to aſcend freer and faſter than they would otherwiſe do; which cauſes ſuch Plants to ripen within the Compaſs of our Summers, which otherwiſe they could not poſſibly do for want of *Heat*.

But indeed the Excellence and Richneſs of this Earth is moſt and beſt ſeen in the Verdure, Fruitfulneſs, and large Production of ſuch Plants as ripen with the Sun, and need no artificial Heat; ſuch as Aſparagus, Artichokes, &c. Theſe arrive not only to equal Size, and make Heads as large as thoſe planted in artificial *Earths*; but do acquire an *even*, *regular* and *pleaſant* Flavour from the well digeſted Matter or earthy Particles in which they grow, and which actually aſcend in their Veſſels towards their Encreaſe. In ſhort, in all ſuch Caſes as ſerve to make a Garden fruitful and profitable, I prefer *Untried Earth* to the beſt of even *rotten* Dungs or the common artificial Compoſts, with which our Books of gardening, as well as the Gardens themſelves, are ſo commonly ſtuffed and filled. And that for theſe following Reaſons:

1. This *Virgin* Earth is not infected with the Seeds of ſuch Weeds as are ordinarily carried about in the Air from Place to Place, becauſe being covered with a thick-ſet Turf, noxious Weeds can find no Place to fix themſelves; and ſo they die and periſh ſoon after their Fall; whereas all artificial Compoſts, that are made with Dung and laid in Heaps together to rot and mellow, are ſubject to receive the Infection of the aforeſaid Weeds; and accordingly Experience ſheweth that ſuch Compoſts and Manures, eſpecially in light Soils, bring ſuch intolerable Poiſons, and ſuch a Multitude of new Weeds along with them as no Care or Art can quickly root out again.

2. Becauſe *Virgin* Earth affords better and *wholeſomer* Productions than can reaſonably be expected from Soils made with Art and Dung; which tho' they are filled with nitrous and ſulphurous Matter, fit to ſet the earthy Particles in Motion for the Growth and Increaſe of Plants and Trees; yet they alſo ſend up many mixt heterogeneous indigeſted Juices, which give *unſavoury* and ſometimes *unwholſome* Taſtes to Leaves and Fruit: Whereas Earth taken from under an old Turf, hath all the Richneſs of *Nitre* and *Sulphur* requiſite for the Purpoſe of Vegetation, and at the ſame Time its earthly Particles ſo well mixt and incorporated, all its Juices ſo well mellowed and refined by Age, that they only want to be ſtirred and expoſed to the kind Influence of the Air, Rain, and Dew, to be made to exert themſelves, by paſſing thro' the Veſſels of Plants and Trees, for their Increaſe and the wholeſome Productions of Nature. And this I ſhould think may ſuffice to regulate the Culture of Plants as a Thing of no ſmall Importance; becauſe as a *Tree*, ſo alſo the *Soil* is known by its Fruit diſcovered by the Taſte. The Difference of the Goodneſs of ſuch Plants and Sallading as are raiſed and brought us from freſh Land out of the Countrey compared with thoſe which the Avarice of the Gardeners, or rather the Luxury of the Age tempts

them even to *force* and *reſuſcitate*, is moſt diſcernible in the untimely and taſtleſs Article of *Aſparagus* at *Chriſtmaſs*.

Brown's Mſſ. "It is certain (ſaith Sir *Thomas Brown*) that about populous Cities " where Grounds are over-forced for Fruit and early Sallading, nothing " is more unwholeſome. Men in the Countrey look ſo much more freſh " and healthy, and commonly are longer lived than thoſe who live in " the Middle and Skirts of vaſt and crowded Cities, invironed with rotten Dung, loathſome and common Lay ſtalls, whoſe noiſome Steams " wafted by the Wind, poiſon and infect the ambient Air and vital " Spirits with thoſe pernicious Exhalations and Materials, of which " they make the Hot-beds for the raiſing thoſe *Præcoces* and forward " Plants, which gratifie wanton Palates. For thoſe being corrupt in " the *Original* cannot but produce malignant and ill Effects to thoſe Acet. pag. 132. " who feed upon them." It was alſo Mr. *Evelyn*'s Opinion long ſince that there is nothing ſo proper for Sallad Herbs and Plants, as the *genial* and *natural* Mould impregnate with well digeſted Juices, without any Mixture of *Garbage*, *Carrion* and other filthy *Ordure*, perhaps not half conſumed. I queſtion not but that every Body would prefer Corn and all Sorts of Grain raiſed from *Marle*, *Lime* and † *Chalk*, ſweet and natural *Soils* for Amendments, before that which is produced from the *Dung-hill* only. Even Experience ſhews that the *Rankneſs* of Dung is frequently the Cauſe of *Blaſts* and *Smuttineſs* in Corn; as if the Author of Nature would thereby teach us to take heed of all unnatural and ſordid Mixtures. It is the Obſervation of thoſe who have been converſant in Vineyards, that Vines forced with Dung and growing in the Vales, produce Wines much more *heady* and *unpalatable*, than thoſe which grow on the Sides of Hills and are leſs forced.

Monſieur Quinteney hath rightly obſerved, that the Senſe of *ſmelling* is a proper Judge of the Goodneſs and Salubrity of Earth; and I would add alſo (ſetting aſide too great Nicety) that the Senſe of *Taſte* is no leſs a Diſcerner of that Matter; and this Reaſon is to be aſſigned for both; becauſe an *ill-Smell* proceeding from Corruption or undue Mixtures will give an *ill Taſte:* And the Fruit or Product will taſte accordingly. But ſtill I add;

3. That tho' artificial Compoſts, if they have had ſufficient Time to mellow and to loſe the Unſavorineſs of Dung, may be ſuppoſed to obtain moſt of the good Qualities of *Untried Earth*; yet here is a Treaſure eaſier purchaſed, always ready at Hand, and immediately fit for Uſe. Theſe are Conſiderations by no Means to be paſſed over ſlightly: For were there no other Advantage but this; that *Untried Earth* anſwers all the Purpoſes of Dung, what a vaſt deal of Manure, unneceſſarily loaded into a Garden, would be ſaved for the more uſefull and profitable Purpoſes of Meadows, Paſtures, and arable Land? If then I can make this rational Doctrine take place, as it ought; eſpecially when confirmed by Experience, I ſhall expect the Thanks of the *Farmer* and the *Gardiner:* Both the *one* and the *other* receiving great Advantages thereby. The *one* ſeeing his Barns filled with Plenty, ariſing from Treaſures formerly waſted; and the *other* receiving the

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† Caule ſuburbano, qui ſiccis crevit in Agris,
Dulcior ——— *Hor. Sat.*

Commendations of his grateful Maſter, for furniſhing his Table with the beſt taſted *Herbs* and *Roots* and the moſt delicious *Fruits*.

Now I am upon this Head, it may not be amiſs to take Notice and adviſe that the Depth or Thickneſs of this *Earth* ſuperinduced in the *Kitchen Garden* is to be diſcretionally proportioned to the Nature of the Plants to be ſown: *Onions*, *Lettuce*, *Spinage*, *Peaſe*, *&c.* which take but ſhallow Hold, will require only two or three Inches Thickneſs: Whereas *Carrots*, *Parſnips*, *Scorzonera* and *Skirrets*, which go deeper into the Ground, may require ten or twelve. The *firſt* Coat of Earth, diſcreetly ſtirred only with a Hough, will laſt good four or five Years, without any *Amendment*; and the *laſt*, becauſe thicker and deeper, will continue good ſix or ſeven Years, ſtirred always with the Spade.

N. B. The Turf, which is pared off from the *untried Earth*, if it is not required to be laid down again, may be laid on Heaps to rot for two or three Years; which, being now and then ſtirred, will prove excellent Soil for Amendments, and particularly good for a Superinduction to the Aſparagus Bed; which being a Plant whoſe Pores and Veſſels are very large, is very apt to admit every Nouriſhment of the groſſeſt Nature, and conſequently to receive a Reliſh and Tincture from all indigeſted Dungs and undue Mixtures.

From the whole of what I have ſaid upon this Head of *Untried Earth* I think this Corrollary of its Virtue and Excellence may fairly be deduced by Way of Analogy; that as it is found by long and conſtant Experience that the animal Life in all Creatures is beſt preſerved and continued by the ſimple and unmixt Products of Nature, and more particularly with Reſpect to Mankind; that ſuch Men as have but (as we ſay) from Hand to Mouth, and are conſtrained by Neceſſity to live upon *ſimple* Diets and the *natural* Food of their own Countrey, are for the moſt Part healthier and longer lived, than thoſe who indulge themſelves by Exceſs, and by a wanton Luxury ſtudy to imbibe *all* that Art and Riches can procure, ſhortening their Days by the intemperate Uſe of mixt and unnatural Foods: So in like manner *Vegetables* of all Sorts, but eſpecially Trees, from which are expected the annual Rewards of Fruit, as they will preſent their Fruit *more beautiful* and *better taſted*, ſo may well be ſuppoſed to be alſo *more laſting* and *durable*, being fed by *ſimple* and *natural* Diets.

A

NEW SYSTEM
OF
AGRICULTURE
AND
GARDENING.

BOOK V.

The Flower-Garden.

I AM now arrived to that Part of my Treatiſe of Vegetables which is not leſs (if not more) pleaſant and delightful than what has gone before. The *Flower-Garden* indeed in the groſſer Senſe of the Word and in ordinary Acceptation, is not *profitable*, but the contrary. But if what tends to the Delight and Pleaſure of Mankind; if what ſerves to transfer the Mind from the Beauty of the Thing formed to the glorious and wiſe *Former* and Contriver of all things; if what gives an Opportunity to fill up the *Parentheſis* of Life (for ſome ſuch there muſt be) with innocent Amuzement and Satisfaction; if all or any of this may be called Benefit and Gain to a reaſonable Creature, then the *Flower-Garden* may well be ſaid to be *profitable*, as it is univerſally allowed to be *pleaſant*.

I would here I confeſs rather chuſe, if the *Fair Sex* would give me Leave, (and it ſhall be done with a great deal of Honour) to addreſs my ſelf to *them*. Multiplicity of Buſineſs and the neceſſary Affairs of Life do not ordinarily engroſs their Time, nor diſtract their Thoughts; theſe Severities are the Load and Complaint of our own Sex: And altho' the *Men* are hereby much diverted from the Amuzements they would otherwiſe chuſe, yet the *Women* are not generally under ſuch Avocations, but have more Leiſure to follow innocent Delights, and ſuitable Recreations. Thus if Inclination and Leiſure could but once agree and unite, I flatter my ſelf the Ladies would ſoon think that their vacant Hours in the Culture of the *Flower-Garden*, would be more innocently ſpent and with greater Satisfaction, than the common Talk over a Tea-Table, where Envy and Detraction ſo commonly preſide.

Whereas, when Opportunity and Weather invite them amongſt their Flowers, there they may dreſs, and admire, and cultivate Beauties like themſelves, without *envying* or being *envied*. There they may diſpoſe the great Variety of Colours, which Nature has given to ſeveral Flowers, and what Order and Mixture they pleaſe; and whilſt they are admiring the Author of Nature for affording theſe elegant Glories, they may at the ſame Time pleaſe themſelves and others with their own Fancy and Skill in *mixing* and *explaining* them.

I ſpeak not this *excluſively*, as if I thought none but the Ladies ſhould meddle with Flowers. The Study and Culture of the Flower-Garden hath been the Entertainment and Recreation of wiſe and good Men in all Ages of the World, and they have always thought, from the Example of *Solomon* himſelf, that the more they unfold Nature's Beauty and Variety in every Part, the more extenſive was the Pleaſure, and the greater the Admiration of its Author.

It was indeed ſome Time before I came to take much Pleaſure in the *Flower-Garden*, having been for ſeveral Years ſo wholly engaged in rectifying Miſtakes, and making ſome intelligible Improvements in the more profitable Part of the *Fruit-Garden:* But I quickly found after I had once planted and diſpoſed my Garden in the Order and Method agreeable to my own Fancy, there was always a conſiderable Part of the beſt Seaſon in the Summer left, when there was almoſt nothing to be done by Way of Diverſion, (at leaſt not much manual Operation by Way of Exerciſe) except I could begin to think of loving and cultivating the *Flowers* as well as the *Fruits:* Still preſerving the Maxim which I had always laid down to my ſelf, and have ſince recommended to others, not to enlarge the Bounds of either Gardens too far, but rather ſtrive to have *multum in parvo*.

After I have ſaid thus much by Way of Introduction to what I have to ſay further about Flowers, their Culture and Propagation, I ſhall only here inform the Reader of the general Method I intend to purſue in treating of this Subject, which, becauſe it hath been pretty much exhauſted of late, and begins now to be generally well underſtood, I ſhall not dwell long upon, intending chiefly to explain what others have left in the Dark, and to ſay as little as poſſible upon that which every one underſtands. Firſt, I ſhall ſpeak of what appears to me to be the moſt proper Situation and Diſpoſition of a Flower-Garden. Secondly, I ſhall treat of ſuch Soils or Compoſitions of Earths as are found to be in the general moſt agreeable to Flowers. Thirdly, I ſhall treat of all the ſeveral Kinds of Flowers, great and ſmall, uſually known and growing with us in *England*; whether *Annuals* from Seeds, or *Perannuals*, propagated from bulbous Roots, or Slips, or Layers.

CHAP. I.

Concerning the Situation and Diſpoſition of the Flower-Garden.

WHERE Election can take Place, one ſhould always chuſe to have the Flower-Garden near the dwelling Houſe; becauſe ſuch Beauty and Ornament, the more they are under conſtant Inſpection, the eaſier and better they entertain thoſe two finer Senſes, *Seeing* and *Smelling*. But then it is not with *Flowers* as it is with *Fruit*, the more Sun they have, the better; and therefore again, where Choice is to be had, I ſhould prefer an *Eaſtern* Expoſition, or if that cannot be had, a *Weſtern*, rather than to let it lye open and entirely expoſed to the Sun's hotteſt and *meridian* Rays, whereby they are apt too ſoon to hang their Heads, to wither away, and die.

There are indeed ſome Sorts (as will be taken Notice of in its proper Place) that want the hotteſt Expoſition to bring them to Maturity and Glory: But theſe are *Foreigners*, and naturalized here with Care and Art, and even *nurſed* in a Hot-bed. Theſe therefore may either be ſet in Pots, and placed or moved occaſionally as Fancy directs; or elſe may be planted by themſelves under ſome Southern Borders near the Houſe (but not to be dropp'd upon) where their Beauty may not be loſt or overlook'd. But then as to moſt of our own *Natives*, ſuch as Tulips, Ranunculus's, Emonies, *&c.* with theſe, it is certain, *too much* Sun is almoſt as bad as *too little.*

But there is a much worſe Enemy to a Flower-Garden than this, which I am now to ſpeak to and caution againſt in the Choice of a Situation; and that is, the *Wind*, that reſtleſs Enemy to all Vegetables; the Fury whereof, if not guarded againſt, is like ſome turbulent Spirits in the World, ever diſturbing the Peace and Quiet of every Thing within their Reach. *Walls* are ſome Defence, where they are tall, and the Garden little; but otherwiſe they do but occaſion great Reverberations, Whirles, and Currents of Wind, ſo that they often do more harm than good. I ſhould therefore chuſe to have the Flower-Garden encompaſſed with Hedges of *Eugh*, *Holly*, or *White-Thorn* (the *firſt* is abundantly the beſt) which, after frequent Clippings, are not only more ornamental than the beſt Walls, but by far more uſeful, and are better Defences againſt the mercileſs Rage we are ſpeaking of, both with Reſpect to the Flowers themſelves, or the Female Lovers.

In ſpeaking of the *Situation* and *Diſpoſition* of a Flower-Garden, there ſhould be alſo ſomething ſaid of the *Form* thereof; which though it muſt and will always vary according to Perſons different *Fancies*;

yet Fancy ought to be regulated by the general Principles of Beauty, and ought to throw the whole into Variety amidſt Uniformity. And leſt the Fancy ſhould not be *humourſome* enough, Mr. *Bradley* has told us of a Method to diverſify and enlarge it almoſt infinitely.

If the Rules of Proportion are but well obſerved, the more *plain* and *ſimple* the Figure, the more beautiful it will appear, the more agreeable the more natural and unaffected. Moſt of the *ſtudied* Plans do diſcover too much of the *tawdry* in them, and are commonly too confuſed to give any diſtinct Pleaſure to the Eye, except it be whilſt they are only exhibited on Paper.

But Care muſt be taken to contrive it ſo that it may be eaſily ſeen, that the curious Artiſt may find Admittance to the Beds in every Part, either by the *large* or by *leſſer* Gravel Walks or Paths; ſo as by the Reach of the Arm every Operation may be performed with Eaſe. And I think I need but juſt ſay, the Center in the Middle of the Circle ſhould be filled with ſome curious Ever-green Plant cut *pyramidically*, and fluited either *perpendicularly* or in a *ſpiral* Line. But I muſt not enter into farther Particulars; for after all, the Floriſt will and muſt be left to his own Fancy.

N.B. All *tall* Flowers ſhould be excluded this Plan; for they will do better diſperſed in Borders elſwhere, where they may have Room to extend their Leaves and Branches.

CHAP. II.

Of ſuch Soils and Compoſitions of Earths as are found to be in the general moſt agreeable to Flowers.

I Have long obſerved that a hot Soil and ſcorching Sand, though never ſo rich, is as bad for moſt of our fineſt Flowers as too much Sun, and that in the general a moderate Degree of *Coolneſs* and *Moiſture* in a Soil is beſt. For which Reaſon, if a proper *Untried Earth* can be found with thoſe two Qualities, no Compoſition of Art can exceed it; and therefore this in the firſt Place ſhould be diligently ſought for, and diſcreetly choſen as a Treaſure in the *Flower*, as well as the *Fruit Garden*, for the ſame Reaſons as are aſſigned in the Chapter of *Untried Earth.* See page 405.

But foraſmuch as it may be difficult, and ſometimes impoſſible to procure this Earth in ſufficient Quantities, and to entire Satisfaction, with reſpect to Richneſs and other requiſite Qualities, I ſhall lay down ſome ſhort Rules and Helps, which every ingenious Perſon may eaſily enlarge or improve, as Situation and Circumſtances may require.

It will eaſily be perceived by what I have already ſaid, that *Horſe-dung*, from its Nature and Qualities (eſpecially if not quite rotted to Earth) is *Poiſon*, and greatly hurtful to moſt Flowers: And if it *is* reduced to Earth, its Lightneſs and hot Nature muſt be qualify'd with other Compoſitions: But the beſt Way of all is to baniſh it. *Strong Clays* on the Surface are alſo on the other Side very undeſirable, as they chill, and ſtarve, and bind the tender Fibres of Flowers; ſo that they cannot extend themſelves to fetch proper Nouriſhment for their Increaſe, and to ſupport their Health. But it is ſeldom ſeen, but that on the ſtrongeſt natural Clays there will be five or ſix Inches of good loamy Earth on the Top; and that is ſufficient, if Care be taken to carry off the wet by Drains into the lower Grounds at a Diſtance. The contrary to *cold Clays*, and equally undeſirable, is *hot and dry Sand*. Each of theſe muſt have different Remedies.

To the cold Clays muſt be mix'd or ſuperinduced large Quantities of ſuch *Untried Earth* as is found to be rich, light, and ſandy; or if this cannot eaſily be met with, rich and light enough, let a third Part of Horſedung throughly rotted to Mould be added. To the naturally hot and dry Sands muſt be added and mix'd rotten *Hogs* or *Cowdung*, which hath the two Properties of being *cool* and *moiſt*. Moreover, on theſe light Soils I have found *Chalks* and mellow *Clays* out of the Bottoms of Ponds to be excellent Superinductions, and fit to bring the hotteſt and lighteſt Sands to a proper Conſiſtency for Flowers: But above all, where *Marle* can be had, that is of a Nature diſſoluble, I have found *that* to be by much the beſt Ingredient to be mix'd with light Soils for a *Flower-Garden*.

Marle is fat, cooling, and heavy, and if a third Part of it be mix'd with two other thirds of light mellow *Untried Earth*, there is (I think) no other artificial Compoſt of Earths and Dungs can *excel*, nay not *equal* it, in all its excellent Properties for accelerating the Growth of Flowers, and explaining their utmoſt Glory and Beauty; eſpecially if ſome Pains be taken with the *Marle* to ſift it fine, and mix it well with the Earth. Some have thought that for *Carnations*, and obtaining the largeſt Flowers, even the Soil taken out of the Bottom of Ditches, where Land Floods have driven the Earth in Heaps, is beſt: And this undoubtedly is very good, when it is diſcreetly choſen; becauſe ſuch *drift Earth* is many Times compoſed of ſome of the richeſt Ingredients and Soils that fall from the upper Grounds; which at laſt and at beſt are but an Imitation of what I have before directed; and yet you can never be ſure of a due Quantity of your Ingredients thus found in Ditches, but that there may be yet too much of one and too little of another Sort: Whereas in the Caſe of *Untried Earth* and *Marle*, you make your Mixture to your Mind, of a due Proportion and proper Conſiſtency. Two thirds of the *firſt* and one third of the *laſt*, I have found to be the propereſt Proportion, if the *Untried Earth* be any thing light, and of a ſandy Nature.

However, becauſe many by their Experience have found other artificial Earths and Compoſts excellently to anſwer their Ends, and their Expectations, what I have ſaid before is not ſpoken excluſively of other Ingredients, for the Purpoſe of moſt, much leſs of ſome particular Flowers. For the Bottoms of old Wood-Piles, well rotted Saw-Duſt and Leaves; the Mould found in the Cavities of old Willow-trees, rotted Thatch, rotted Cow-dung, Turf-aſhes, Lime, and the Dung of Hogs and Poultry mellowed and ſweetened by Age. Theſe are all good and excellent, and very agreeable to moſt Flowers, if they are mix'd with Diſcretion and Knowledge, *i.e.* if the *hot* and *light* Kinds are duly and proportionably mix'd with the *heavy* and *cold*. Only I ſtill add, that the Difficulty of mixing *theſe* rightly is greater and more hazardous than in the Caſe above: Though it ought to be taken Notice of, that the Dung of Hogs and Cows alone well reduced to Mould, have done Wonders in explaining ſome Flowers.

Thus becauſe it is impoſſible to lay down one general Rule for a Preparation of Soil, that may ſuit *all* Flowers, I ſhall think my ſelf obliged to take Notice, as I go along, where any particular Composts or Mixtures will be neceſſary for the Benefit and Proſperity of ſuch particular Flowers.

Whether the Flower Garden is to be formed out of a natural Soil grown over with Turf, or whether from confuſed Rubbiſh or worn out Ground, it is neceſſary that it be frequently turned over during the whole Summer, that it may be perfectly cleaned from Stones, Roots and Weeds: For by thus turning and tumbling the Earth backward and forward, not only what grew upon the Surface will be deſtroy'd and mellow'd, but the Seeds of Weeds (ſome of which will lye ten or fifteen Years in the Earth, and afterwards grow) by being made to vegetate and ſprout, when they are diſturbed, will periſh by the Heat of the Sun.

Thus the *Soil* being with Care and Diligence brought to a proper, clean, and mellow Condition, and the Superinductions rightly adjuſted and mixed, the beſt Seaſon and Time for putting it into a Figure and Form for Buſineſs, is about *Michaelmas*, and all the Month of *October*, which is the propereſt Time for *ſetting* bulbous Roots, ſuch as Ranunculus's, Emonies, Tulips, &c. and for *ſowing* many Sorts of Flower-Seeds, as will be obſerved hereafter. But although I have given a Specimen of a Figure for a Parterre, (and there are many other Varieties to pleaſe the Fancy) yet it may not be amiſs to obſerve here, to direct the ingenious Floriſt in ſhaping his Earth in the Borders, and Compartments, that the beſt and moſt graceful Figure for the Plain of the Earth, is the Shape of a *Carps Back*, riſing pretty much in the Middle, and ſo of Courſe ſinking gradually to the Boders or Edgings. For by thus forming as it were, a Sort of an *Arch*, it will ſet off the Plants it contains with an agreeable Beauty, and make the Flowers appear in every View much better and more graceful, than if they were ſet on a *Flat*.

I cannot but here repeat what I before hinted at; that it will by no Means be proper to plant or ſow the talleſt Race of Flowers in the Parterre, except it be of much larger Extent, than what I have before ſuppoſed; For Sun-Flowers, for inſtance, Hollihocks, white and orange Lillies, tho' proper and beautiful in their Places, yet amongſt *Reptiles* and the lower Race of ſome of the moſt beautiful Kinds do not *add to*, but *take away from* the Beauty of the whole, and exhibit to the Eye a confuſed Wood all on a Heap.

All *Reptiles* therefore and Flowers of the humbler Size ſhould be ſet in Compartments by themſelves judiciouſly ſorted both as to their Kinds and Stature. Thoſe that riſe about a Foot high ſhould be ſet in the Middle of the *Gibbous* Part of the Compartment; ſuch as Narciſſus Rockets, &c. Thoſe of ſix or eight Inches as Iris, Candia-Tufts, ſweet Williams, &c. in the next Order; and Auricula's, Polianthus, Crocus, and ſuch kind of humble Flowers neareſt the Edgings. And if this Gradation of Flowers were further ſo ordered as to anſwer the ſame Times of blowing, the Beauty would ſtill be the prettier, more intire and uniform.

Thus it may be plainly ſeen what I aim at and would adviſe, *viz.* To keep a Wilderneſs out of the Flower Garden, and to let the Wilderneſs of Flowers grow, where it may be a real Ornament in the Borders of the grand Squares, or Parterres, or under the North Walls at a great Diſtance, or in any by or angular Places. *Tulips*, *Ranunculuſes* and *Emonies*, ſhould by all Means have Places allotted for them by themſelves; becauſe their Varieties are great, and nothing elſe ought to interfere; becauſe nothing elſe of the bulbous rooted Kinds can compare with their Beauty. Further,

Water being ſo very neceſſary for all Flowers, eſpecially thoſe that are new planted from *Layers*, *Slips* or *Roots* parted, it may be thought proper that I ſhould ſay ſomething of the beſt Kinds. Well-Water or all ſuch as are accounted *hard* are the worſt. Running Water is eſteemed excellent, becauſe being in continual Motion it ſubtilizes and warms itſelf, acquiring fertilizing Qualities from the terreſtrial Matter mixt with it. Rain-Water hath wonderful Properties in Vegetation, from its having imbibed the nitrous Spirit of the Air. And as for *Pond* and *Standing* Waters, they muſt be very proper for Plants, as being wonderfully repleted with terreſtrial Matter, which alone is fit for the Formation and Augment of Flowers as well as Plants: But neither to *that* nor to *Water* is owing the Variety of Colours (as hath been vulgarly miſtaken) but only to the Figure of their different Ducts and Paſſages.

In ſhort, the great Difficulty of all is to have a Command of Water of any Kind near the *Flower-Garden:* For the very *worſt* may very eaſily be made *good*, if it be ſuffered to ſtand ſome Time in the *Sun* and *Air*; and more eſpecially if Sheeps Dung, or Garden Mould be infuſed in it.

Before I conclude this Chapter I ſhall advertiſe the Reader, that in treating of *Flowers*, I ſhall uſe the ſame Method I did in treating of *Plants*; firſt, give a Table or Catalogue of all ſuch Kinds and Sorts of Flowers as uſually grow in our Iſland; and then particularly explain their Nature and direct the beſt Methods of cultivating and increaſing them.

A complete Catalogue of Flowers great and ſmall, perannual or annual, uſually known or propagated in England, *either in the naked Ground or Hotbed.*

Perannual Flowers of the talleſt Size.

Campanula pyramidalis.
Aſters or Starworts.
Holly-hocks.
Perannual Sun-Flowers.
Everlaſting Pea.
Canterbury Bells.
Fox-Gloves.
Lillies.
Martagons.
Mulleins.
Primroſe-tree.
Tuberoſe.
Cardinal Flower.
Belvedere.

Perannual Flowers of the middle Size, whether from bulbous Roots or Off-ſets.

Moly.
Aſphodils.
Piony.
Julian.
Narciſſus or Daffodil.
Fraxinelle.
Valerian.
Cyanus or Blue bottle.
Roſe-Campion.
Rocket.
Monks-Hood, aconite a violent poiſon.
Scarlet Lychnis.
Sweet William.
Crown Imperial.
Acanthus.
Carnation and Pink.
Stock Gilliflower.
Wall-Flower.
French Honyſuckle.
Cardinal Flower.
Hyacinth.
Collumbine.
Iris.
Corn-flag.
Orctius.
Frittilarie.
Globe-flower.
Star-flower.
Geranium or Cranes-bill.
Anemone.
Tulip.
Ranunculus.
Cyclamen.
Hellebore.
Lady's Slipper.
Bacchus Bole.
Jonquile.
Baſtinet.
Lillie of the Vale.
Dogs Tooth.
Spider Wort, or Bruno's Lillie.
Batchelors Button.
Dittany.
Paſque-flower.
Colchicum.
Mandrake or Golden Mouſe Ear.

Reptiles or the loweſt vivacious Flowers.

Auricula.
Polianthus.
Daſie.
Gentionella.
Hepatica or Liverwort.
Violet.
Crocus, and Colchicum.
Snow drop.
Indian Pink.
Panſie aconite.

Annual Flowers from Seed.

Sun-Flower.
Snapdragon.
Lark-Heels.
Poppies Argemone.
Candia-Tuft.
Double Marigold.
Venus Looking-Glaſs.
Venus Navel Wort.
Parnaſſus.
Muſcipula or Catchflie.
Flos Adonis.
Nigella.
Lupines.
Scarlet Beans.
Annual Stocks.
Viola tricolor.
Pheaſant's Eye.
Mallows,
Scabious.
Royal comfrey.

Annuals to be ſown in Hot-beds.

French and African Marigolds.
Amaranthus.
Convolvulous.
Marvel of Peru.
Female Balſom.
Sweet Sultan.
Capſicum Indicum.
Indian Creſs.
Senſitive }
Humble } *plant.*

CHAP. III.

Of perannual Flowers of the talleſt Size.

I begin with the *Campanula pyramidalis*. Of which there are two Sorts the *white* and the *blue*; the firſt is little accounted of; but the *blue* is greatly eſteemed, not for its Flowers taken *ſingly*, but as making ſo handſome a Shew *altogether* with a Multitude of little blue Bell-flowers growing in a Pyramid, ſometimes five or ſix Foot high; which height makes it neceſſary to ſupport the Stalks with Sticks. And when this Plant is ſet in a Pot ſupported with Sticks beautifully painted, it may become the Cloſet or the Chamber of the niceſt Lady. They delight in a ſandy Soil, and are ſometimes raiſed from Seed ſown in *September*, but moſt commonly they are raiſed from Slips parted from the Roots in *March*.

Star-flower.

The *Star-flower* or *Aſterwort*, by ſome called alſo *Oculus Chriſti*, bears its blue or purple Flowers in *October* on ſeveral Stalks about three Foot high, and not exceeded by many in Beauty. There is another Sort which bears alſo purple Flowers in *Auguſt*, but not ſo tall as the other. Beſides which, there are alſo great Varieties of leſs account. But it may not be improper to mention the *Arabian Star-flower*, which diſcovers its Beauty in *May*; the *Naples*-Sort, the *Star of Bethlem*, both *yellow* and *white*, which flower in *April*. Theſe are hardy Plants, and may be multiplied by Seed, but beſt by the Roots parted in Spring, every one of which will quickly grow and bear Flowers the ſame Year in almoſt any Soil and Expoſition.

Holly-hocks.

Hollyhocks are very aſpiring Flowers, riſing often with ſeveral Stalks more than ſeven or eight Foot high; and therefore proper Places againſt Walls or the Corners of Gardens ſhould be aſſigned them, where they may explain their Beauty to diſtant Views; for the ſeveral Sorts of them bear Flowers of almoſt all Colours: And thoſe which are double make a beautiful Shew in Autumn. The double ones bear Seeds and from them they ſhould be raiſed, and they will bear the ſecond Year; but they may be alſo raiſed from Off-ſets, which is the ſureſt Way to continue or increaſe the Sort. *March* is the Month for both Methods.

Sun-flower.

The *Sun-flower* or *Heliotrope* is of two Sorts. The firſt here ranked among the *perannuals* is that which ſprings from the Root every Year and ariſes from many Stems, making a goodly Shew with a Multitude of yellow Flowers, which becauſe they are apt to turn to the Sun, have acquired the Name of *Heliotropes*; but this properly is yet no more than what moſt other large Flowers growing tall, have. Theſe are ſo large and ſpreading, that they hardly find Admittance in ſmall Gardens; but in large ones they are very great Ornaments artfully placed at proper Diſtances: But neither are theſe ſo large as thoſe of the annual Sort raiſed from Seed ſown in *March*, which will often grow eight or nine Foot high, with many Branches loaden with large yellow Flowers a Foot diameter. Theſe die and muſt be ſown every Year, but with

Caution too; for they have matted Roots, and do much *beggar* the Ground. The Seed of theſe affording a good Quantity of Oil, tempted ſome Time ſince a Projector to ſow a whole Field, in Hopes of Riches from the Oil: But he ſoon repented his Experiment, when he found he had almoſt ſpoil'd his Land.

Everlaſting Pea.

The *Everlaſting Pea* is raiſed from Seed ſown in *March*; for it hath a Root like a Carrot, and bears tranſplanting very ill. It bloſſoms not till the ſecond Year after ſowing; but then it continues its Peach-Bloom Bloſſoms for above two Months; and if the Plant is ſupported either by Hedge or Tree, it will grow eight or nine Foot high. It is thought by ſome, that if the Bloſſoms are ſteep'd in Spirit of Wine, a fine Blue may be produced, not much inferior to the *Vltramarine*.

Canterbury Bells.

The *Canterbury Bells* differ from the *Campanula Pyramidalis* in not growing ſo tall, and having their Flowers of a deeper blue. They have rough Leaves like a Nettle, and ſquare Stalks on which the Flowers grow. There are three or four Sorts of theſe cultivated in Gardens; one of which bears a double Flower, but every Way elſe like the common Sort. There is another Sort which has a Root like a Rampion, creeping under the Surface of the Earth, and thereby encreaſes very much; and this is by ſome called the Peach-leaved Bell-flower, from the Reſemblance its Leaves have to thoſe of the Peach-tree. Another Sort bears white Flowers.

Foxgloves.

The *Fox-glove* is a very tall Plant, riſing with its Stalk two or three Foot high, and ſometimes more, and therefore ſhould be placed in the Borders of a Parterre that is full of the larger Sort of Flowers. This being of the vivacious Kind, may be raiſed by Roots, as well as multiplied by Seed; and the beſt Time of doing both is in *September*. Some reckon up three or four Sorts of *Fox-gloves*, but there are only three Sorts cultivated by Gardeners: The talleſt Sort is the *Iron coloured*, and the other two are alſo diſtinguiſhed by the Colours of their Flowers, *viz.* the *purple* and the *white*. To make the moſt agreeable Shew, their Stalks ſhould be ty'd up to a Stick, and not crouded too near one another. They delight in the Shade, and thrive beſt in a loamy Soil.

Lillies.

The *Lilly* by its *Name* diſtinguiſheth it ſelf from thoſe that are leſs valuable. It is ever mentioned with Eſteem by the Antients; and both ſacred and profane Authors, when they would make any Thing appear glorious, or make a moſt beautiful Compariſon, are wont to introduce the *Lilly*. But of theſe there are ſeveral Sorts, ſome more, ſome leſs beautiful, according to Perſons different Fanſies. The *Orange Lilly*, the *white Lilly*, the *double bloſſom'd white Lilly*, the *ſtrip'd leav'd Lilly*, and *another Kind*, which produces Bulbs upon its Flower-ſtalks, are the chief of this Kind deſerving Care and Cultivation. It hath not hitherto been made certain that any of the Lillies have brought their Seed to any Perfection, the Flower always falling without leaving any Fruit behind it. So that the readieſt Way to encreaſe this Flower, is by Off-ſets from the Roots, which are wont to encreaſe and multiply very much; and theſe may be taken up and planted again any Time, from *Auguſt* till the latter End of *October*.

To change the Colour of the Lilly, and to have it of a purple Hue, whilſt it bloſſoms, ſome curious Perſons recommend the following Method. Take ten or a dozen of the Stems; tye them cloſe together, and hang them over a Chimney, where they will put forth ſmall Roots like a Bulb or Shallot on their Stems; and when the Time comes to plant, let the Branches be well ſteep'd in the Lees of Claret until they become very red and tinged. Then plant them in this State, and pouring a large Quantity of the ſame Lees upon them, the Lillies that will be produced, will bear a Flower of a purple Colour. But *quære*.

Martagons. The *Martagon* is indeed but another Sort of *Lilly*, whoſe Leaves turn inward, and grow crooked, and is for that Reaſon called *Lilium intortum*. There are ſeveral Sorts of them differing in little elſe beſide the Colour of their Flowers, and all of them have this Property in common, that they ſhoot forth a great Number of Roots, by which they are ſo multiplied in *October*. This is alſo to be planted among Flowers of the largeſt Size, or rather at due Diſtances in the Middle of Borders, among Flowers of a leſs Size.

Mulleins. There are divers Sorts of *Mulleins* bearing Flowers of different Colours, *viz. brown*, *black*, *white*, *red*, *green*, *purple* and *yellow*. This Plant is apt to gather a Multitude of Moths about it, from whence it is by ſome called *Moth Mullein*, and it ſeldom bloſſoms lower than four Foot, and often ſix Foot from the Ground; and although they are moſt of them wild Plants, yet the beautiful Spikes of Flowers they throw out, recommend them to the Eſteem of the Floriſt, who thinks them proper Companions with many others of taller Race. They love a ſandy Soil and the Shade, are to be multiplied by Seed ſown in Autumn or *March*, and will bloſſom the ſecond Year after ſowing.

Primroſe-Tree. The *Primroſe-Tree* obtains its Name from the Reſemblance the Bloſſoms have to the common *Primroſe* in Shape, Colour and Smell. It riſes near three Foot high, will grow in any Soil, is to be raiſed from Seed ſown in natural Ground in the Spring in Nurſeries, and from thence ſhould be removed in proper Places in Autumn; for they bloſſom not till the ſecond Year. They flower in *June*, and the Seed is ripe in *Auguſt*.

Tuberoſe. The *Tuberoſe* is a Sort of *Lilly* or *Hyacinth*, riſing three or four Foot high, and about the Bigneſs of one's little Finger. On the Top of this Stem grow ſeveral Flowers ripening one after another like thoſe of the white *Lilly*, but vaſtly better ſcented, and of an higher Perfume. Although this curious Flower is a Native of *Italy* and the Southern Parts of *France*; yet it is now become very common in *England*, eſpecially ſince the Roots are brought yearly to us from thoſe Parts at very moderate Rates. The Engliſh Roots and Off-ſets will indeed be brought to flower with Care; but then their Stems are never ſo big as thoſe that are brought to us from abroad, nor are the Flowers ſo large, numerous, and beautiful.

Having therefore fixed upon ſome large and ſound Roots, about the Beginning of *February*, a Pot with rich and well prepared Earth ſhould be allotted to each Root, which ſhould be only juſt covered at firſt, and no Water given to it; but let the Pot be ſet up to the Neck in a Hot-Bed diſcharged of its greateſt Heat, and then either covered with Frames or Bell-Glaſſes; for the leaſt Froſt deſtroys them when they firſt begin to ſpindle.

After they have ſhot three or four Inches, you may begin to give them ſome Water, a little at a Time, for too much Wet rots them. And then about the Middle of *April*, the Pots may be removed from the Hot-bed, and either ſet in South Windows within Doors, or againſt a warm Wall with Bell-Glaſſes over them till the Middle of *May*, when they will be able to ſhift for themſelves, with no other Care but a warm and ſheltered Situation, and a little Pond Water every Day about Noon.

When they begin to ſpindle, and the Flowers Buds ſhew themſelves, they muſt be ſupported with handſome taper Sticks; which if they are painted yellow, and blue on the Top will add ſome Luſtre to the Flower, whoſe Excellence conſiſts chiefly in its odoriferous Perfume. What is ſomething particular in the *Tuberoſe* is, that the Flowers blow ſucceſſively one after another, by which Means it continues a long Time in Bloom, eſpecially if it is kept within Doors, as it ought; for then the whole Room will be perfumed with the Odour of the Flowers.

Cardinal-Flower. The *Cardinal-Flower* was brought into *England* from the *Weſt Indies*, and is much eſteemed amongſt the Floriſts. There are two Sorts of them, the one bloſſoms about two Foot high, and bears Flowers of a pale blue, the other bears very beautiful Flowers of a crimſon Colour on ſlender Stalks three Foot high. They may be raiſed from the Seed ſown in a Hot-bed; but the beſt Way of encreaſing them is from the Root, by planting them in *April* in Places well expoſed to the Sun. They begin to bloſſom the Beginning of *Auguſt*, and continue their Beauty near two Months.

Belvedere. The *Belvedere* is one of the taller Sort of Perannuals, riſing in ſeveral Stems three or four Foot high. However, though it will bear the Winter, and may be removed in the Spring, it is beſt to raiſe it from Seed ſown in the Spring; for the Root of this Plant is very ſenſible of the Air, and will dye if it be not immediately planted and watered as ſoon as it is taken up. This, and indeed all the preceding Sorts of Flowers are fitteſt for the large and ſpacious Borders.

Comfry. *Royal Comfry* is of a beautiful Green, and bears ſeveral Flowers falling down like Cat's Tails, reſembling on one Side the *Lark-heel*, and of a deep Red. It is multiply'd by dividing the Roots in Spring, and ſetting it either in a Pot or ſome ſheltered Place; for the Cold much affects it. It is eſteemed a good Ornament to Borders, whether ſet among Flowers of a larger or ſmaller Size.

CHAP. IV.

Perannual Flowers of the middle Size, whether from Bulbous Roots or Off-ſets.

Moly. THE *Moly* is called by ſome the *Wild Garlick*; of which there are great Varieties: *viz. Homer*'s *Moly*, who gave the firſt Name to it; the *Hungarian Moly*, the *Indian Moly*, the *Serpent's Moly*, the *yellow Moly*, the *purple Moly* and the *Silver Moly*, beſides the *Moly of Montpelier*, which flowers late in *September*: For all the reſt flower from *May* to *July*, making a very agreeable Figure in a Flower-Garden, either in the naked Ground or in Pots. They ordinarily ſhoot forth Stems a Yard high, on the Top of which appear Flowers of ſeveral Colours before mentioned, whoſe Leaves fall down like the Tops of Fennel. It thrives in any Soil, and is to be propagated from its Bulbs either in Autumn or Spring.

Aſphodils. The *Aſphodil* is by ſome called the *Kings-Spear*, becauſe whilſt in flower, it looks like a Scepter. There are two Sorts of it, little differing from one another, ſave that the one branches out much more than the other. It is better multiply'd by the Roots than by the Seed, and it deſerves a Place amongſt the larger Flowers in the open Borders or Parterre.

Peonie. The two Sorts of *Peonies* are diſtinguiſhed by their Sexes. The *Male Peonie* bears a Flower on the top of a Stem about three Foot high in the Shape and Colour of a *red Roſe*, but much bigger and more double. The *Female* differs not much from the *Male*, only the Flowers are not ſo large. They commonly flower in *May*, and endure long in the Ground without much Care or Art; and, which is its Excellence, it thrives beſt where tenderer Plants will not live, in the Shade, and where it is leaſt expoſed to the Sun. It is propagated by ſeparating the Roots in Autumn or Spring.

Julian. The *Julian* ſhoots out ſeveral hairy Stalks and pointed green Leaves, which are garniſhed with white Flowers of a very pleaſant Smell. It may be multiply'd by the Seed ſown in *October*, or early in the Spring; but then many Flowers muſt not be expected the firſt Year: But from Slips and rooted Plants you may expect Flowers the ſame Year, which are ſometimes diverſified with purple and white. This Plant is ſuppoſed to be good infuſed in Drink for the Scurvy, for inveterate Coughs, for Aſthma's and in Convulſions; for its Property is to provoke Sweating. It is not uncommon to find this Flower grow wild in Hedges.

Narciſſus, or *Daffodil.* Of the *Narciſſus* there are great Varieties brought amongſt us by curious Floriſts, of different Colours and Shapes. Some are *ſingle*, ſome *double*; ſome *white*, ſome *yellow*; ſome *large*, and ſome *ſmall*; and amongſt theſe, ſome are *earlier* and ſome *later*. On which Account there is of Neceſſity required ſome different Management and Culture.

The *Italian Narciſſus* has a yellow Cup and white Flower, and ſhould be planted in light Earth. The *Narciſſus of Conſtantinople* is obſerved to ſhoot forth twelve Flowers with white Leaves at the top of its Stalk, having other ſmaller Flowers of a yellow Colour in the Middle. The Beauty of this Colour is very great, but it ſhould have ſome Aſſiſtance to make it open and explain it ſelf well. For which Purpoſe the *Tunicle* which contains the Flower ſhould be dextrouſly ſlip'd with a Penknife, that the Flower may make its Way the ſooner; otherwiſe it would be in Danger of being ſuffocated by its Membranes, which are apt to keep it as in a Priſon. Theſe are thought beſt to be removed every Year, and carried to ſome very dry Place, otherwiſe were they to be left in the Ground, they would throw out ſo many Suckers as would weaken them, and prevent their blowing.

There is a *yellow pale Narciſſus*, whoſe Leaves are commonly parted and curled, which is ſuppoſed to do better in Pots than in the open Ground, though it requires a lean Earth and a Degree of Shade to bring it to its greateſt Perfection.

The *White Autumnal Narciſſus* requires alſo a lean Earth and little Sun, and may be planted two Inches aſunder.

The *Spaniſh Narciſſus* is both double and ſingle, and requires the ſame Soil and Culture with the *yellow* Sort.

The *long* or (as it is called) *Camel neck'd Narciſſus* thrives beſt in a rich Soil, not too much expoſed to the Sun, becauſe it is moſt beautiful when it blows *late*. Theſe ſhould all be removed at leaſt once in three Years.

It would be almoſt endleſs to mention all the various Sorts of *Narciſſus*, which the curious have of late diſcovered or deſcribed: But it would be the higheſt Injuſtice to the Crown and Glory, and King of them all, to ſay nothing, or but little of the *Narciſſus of Japan*, which is by all allowed to have the Precedence and to excel in Beauty.

It is not above half a Century ſince this delicate Plant was brought over to us from the *Indies*, when it was firſt called the *Japan Lillie:* But afterwards as the Merchants trading from thence, and unloading at the Iſland of *Guernſey* the Ballaſt, in which lay accidentally and confuſedly many of theſe Roots, they ſoon became plentiful there, and obtained the Name of the *Guernſey Lillie*, from whence at this Time we have them brought to us into *England*; the Want of which Knowledge hath occaſioned our modern Authors writing about Flowers to ſpeak of this and the *Narciſſus of Japan* as two different Flowers: There are indeed two or three Kinds of theſe ſomething differing from one another, and the greateſt Difference is in one which flowers the Beginning of *June*; but they have been all brought from *Japan* to *Guernſey*, and from thence are derived to us. The two other Sorts which flower in *October* and *November*, are alſo very choice and beautiful Flowers in the Form of a Lillie of a crimſon and white Colour. The Cover wherein the Flower is incloſed is compoſed of white Membranes, which at their firſt opening diſcover the Flower Leaves of a Pink Colour, repreſenting a Bunch of Feathers both in the inner and outward Side ſix unequal Pivots ſhoot out from the Midſt of theſe Flowers, on the Top of which ſome *Stamina* appear like thoſe of *Saffron* falling down like the Tops of *Fennel* of a beautiful and agreeable red. The whole Flower looks as if it was powdered with Gold-duſt, the Ground of the Petals being of a Roſe Colour.

Two thirds of Sea-Sand and one third of Garden Mould ſeems beſt to imitate the Nature of the Soil from whence they come, and they are obſerved to thrive in ſuch. They will bear our Winters under a good South Aſpect; for they delight in a hot Sun. The Want of which is oftentimes the Occaſion they will not blow with us; but to make ſure of that, the only Way is to give ſuch as are in Pots the Advantage of a gentle Hot-bed in *Auguſt*. The Off-ſets ſhould be removed once in two or three Years, and even *they* will ſoon with Care be brought to bear.

Fraxinelle *Fraxinelle* or *baſtard Dittany* ſhoots out Leaves like thoſe of the *Aſh*, tho' ſmaller; is a hardy Plant every Year ſhooting from its Root Stalks about two Foot high, on which are diſcovered Flowers not unpleaſant about Midſummer, and it is propagated by Plants or Seeds.

Valerian. Of the *Valerian* there are obſerved chiefly three Sorts of different Colours, eſteemed chiefly for their fragrant Smell. One is diſtinguiſhed by the Name of *Dodonæus* or *red Valerian*. Another is called the *Garden* or *white Valerian*; both from the Colour of their Flowers on the Top of their Stems, and the third is called the *Greek Valerian*, and bears Flowers of a pale blue Colour on the Top of its Stalk; and this Sort hath ſometimes variegated Leaves. Theſe are all of them apt enough to ſow themſelves from their Seed Veſſels, and may be encreaſed by Off-ſets. They bloſſom in *May* and *June*.

Cyanus.

The original Sort of *Cyanus* or *Blue-bottle* is wont to grow plentifully amongſt Wheat: But yet there are two or three Kinds of them, which Gardeners think worth their while to encourage and propagate; *viz.* the *great Cyanus*, and the *Cyanus of Conſtantinople*. This Flower will grow almoſt any where and in any Soil; but the more Care and the better Soil it hath, the fairer will the double Flowers be, which are of a light blue Colour, which being the leaſt frequent amongſt Flowers, is the more to be valued and encouraged. It may be raiſed from Off-ſets in *March*, or from Seed ſown in Autumn with a View of tranſplanting them in Spring.

Roſe-Campion.

The *Roſe-Campion* that hath a ſingle Flower is not ſo valuable as the double one, which is either *red* or *red and white motled*. If you raiſe it from the Seed, it muſt be from the ſingle one; for the other bears none, but it may be raiſed from Slips ſet in *March* in the Shade. It is a pretty beautiful Flower; for the *red* is very dazling, and the *red and white* is no diſagreeable Mixture. Its Stem is about a Foot high, and it blows about Midſummer.

Rocket.

The *ſingle flowring Rocket* is of little eſteem; but the *double flowring white*, and the *double fleſh coloured* are pretty Ornaments in the Flower-Garden, equalling and reſembling in Beauty the *double white ſtock Gilliflower*. They are apt to kill themſelves with bearing too many Flowers, and therefore too many Stalks ſhould not be ſuffered; but ſome of their Heads ſhould be cut off before they flower, which is commonly in *May*. They are increaſed by Slips taken from about the Roots and planted in *March*, and the ſame Year will blow on Stalks about a Foot high.

Monks-hood.

This is a Plant that is raiſed with little Care: The Seeds thereof are large, and ſhould be ſown in *March* under ſome Wall or againſt a Trellis or Arbour, where it will riſe three or four Foot high. Mr. *Chomel* and *Liger* aſcribes a Property to this Flower which has never been known or obſerved in *England*, *viz. that it faſtens itſelf to every thing it lays hold on like Peaſe*; but I could never obſerve that it has any *Tendrils*, but grows upright with a ſufficient Strength of its own. It derives its Name from the Reſemblance the Flower bears to the Hood of a Monk, having its *Valves* and *Tip* behind. Its Flowers are of a beautiful deep Blue, and a very uncommon Form; but I cannot underſtand why Mr. *Bradley* ſaith this Flower is rarely found in the Gardens about *London*, for it is one of the moſt common Ornaments, I think, in *all* Gardens. But he doth right to lay in a Caution againſt its poiſonous Nature, for I have ſometimes trembled to ſee Diſhes garniſhed with its Leaves and Flowers, which appear in *May* and *June*. It may alſo be propagated by parting the Roots.

Scarlet Lychnis.

The *Scarlet Lychnis*, called alſo Flower of *Conſtantinople* and Flower of *Briſtol* is a Plant well known and admired for its Beauty. The *ſingle* as well as the *double* Sort ſtrike the Eye with its pleaſant ſcarlet Flowers, which appear in their Glory in *June* and *July* on Stalks three Foot high ſometimes. The double Sort eſpecially is ſometimes graced with a Pot, or elſe is ſet in the niceſt Quarters of the Flower-Garden amongſt the taller Beauties. They love a light and rich Soil, may be increaſed by ſlipping the Root in *March*, or from Seeds of the ſingle Sort ſown in Autumn.

Sweet-William. There are two or three Sorts of this pretty Flower; and indeed the Sorts are almoſt infinite if you nicely obſerve the Diverſity of Stripes and Colours, and the Sportings of Nature even in Flowers on the ſame Stalk, there being hardly to be found two exactly of the ſame Sorts, except they prove (as they do ſome times) *Self-coloured.* The Flowers view'd ſingly are but ſmall, and yet it is obſerved that no Flower of its Bigneſs can ſhew more Beauty within ſo ſmall a Compaſs. The *ſingle* ones differ only in the Colour of their Flowers; ſome are *red and white* prettily intermixt; others are mixt with a *deep Crimſon*, and bear their Bloſſoms about *Midſummer*, and from their Seeds great Varieties have been raiſed. There is alſo a *double* flowering Kind of a beautiful *red*; but this having no Seed, muſt be raiſed from Slips in the Spring, and planted in an Earth not too light.

Crown-Imperial The *Crown Imperial* is by the Vulgar called *Crown and Pearl* by Way of Corruption of the Word; but they found by Reaſon of that Name on the Diſcovery of many round Globes at the Bottom of the Flower like ſo many *Pearls:* It is one of the largeſt Kind that blows ſo early in the Spring as *March*. The common bears a *ſingle* Row of yellow Flowers; but the *double* is that which is moſt eſteemed, the Flowers whereof are diſpoſed in the Form of a Crown and appear like a Lilly of ſix Leaves. One Sort of this Flower is found with variegated Leaves, green and white, which when (they are ſet in Rows) make a very agreeable Shew in the Spring. They are propagated either by its bulbous Roots and Off-ſets removed at *Midſummer*, or (which is the furtheſt Way about) by the Seed ſown in Autumn.

Acanthus. By the Authority of Mr. *Bradley* I inſert *Acanthus* here, having never ſeen it my ſelf. He ſaith indeed it is very rarely found in the Gardens about *London*, tho' it is a great Curioſity and of eaſy Culture. The Flowers appear in *June* upon Stalks of about two Foot high, ſhaped like the Bloſſoms of the Fox-glove and are of a *Peach-bloom* Colour. The Leaves of this Plant it ſeems are not without Beauty, full of Thorns like Thiſtles and prettily variegated. The Seeds muſt be ſown in *March*, but will not bloſſom till the ſecond or third Year. They love the Shade and a ſandy Soil.

Carnation Whether we conſider the *Carnation* with Reſpect to the Duration and Continuance of its blowing, the almoſt numberleſs Varieties it affords, the ſurprizing Mixture of Colours in many of them, and the ſurpaſſing Beauty and Excellence of ſome choice ones every Year of late introduced amongſt us, and the agreeable Scent in them all; if the *Vine* may be ſaid to be the *King* of Fruits; the *Carnation* muſt be allowed to have the Precedence here and to be the *Queen* of Flowers.

There are ſome general Claſſes, under which Gardeners commonly range them, which for Diſtinction Sake I ſhall here mention, *viz.* the *Picketees*, *Painted Ladies*, *Beazarts*, *Flakes*, and *Flames*; the general Characters of which are thus: The Flowers of the *Picketees* are of a *white* Ground ſpotted with *red* or *purple*. The *Painted Ladies* have their Petals dyed on the upper Side either with *red* or *purple*, and the nether Side of their Flower Leaves is *plain white*. The Flowers of the *Beazarts* are variegated with four diſtinct Colours; the *Flakes* are of two Colours only, and thoſe always ſtrip'd. And the *Flames* have a red or flame-coloured Ground, ſtrip'd with *black* or *purple*, or ſome very dark Colour.

But foraſmuch as there are vaſt Varieties in all theſe ſeveral Sorts of Tribes or Claſſes (the *Picketees* eſpecially) every one complemented with Titles of Honour and Diſtinction. And becauſe Names are precarious and arbitrary Things, carrying no certain Mark of Difference, I ſhall not enter into thoſe Particularities, but chuſe rather to ſay ſomething about their general Culture and Management.

Every one knows that a *Carnation*, and every diſtinct Sort of it, is beſt and ſureſt propagated from *Layers*; that is to ſay, from collateral Branches proceeding from the Mother-Root, and not ſpindling into a Flower. Theſe Branches ſlit from the Middle of the firſt Joint neareſt the Root upward, and left with a Lip, and afterwards peg'd down into fine Mould, will eaſily, in about a Month or ſix Weeks, ſtrike Root from the Lip. If this Operation (which is eaſy and familiar; *I will not ſay, to the Ladies)* be performed in *June* or *July*, the Flower may be taken from the Mother-Root with Safety before Winter, and ſet in a prepared Bed; or if it ſtand in its Place till Spring, it may then be removed into a Place where it is wanted; for I need not ſay that the beſt Sorts deſerve each one a Pot, which being to be moved, either within or without Doors, is often the Occaſion of the Preſervation of ſome of the choiceſt and tendereſt Sorts.

Every one alſo knows that our beſt *Carnations* (or *Gilliflowers* or *July-flowers*, for ſo they are alſo called) are raiſed from *Seed* ſown in skreen'd *untried Earth*, taken from ſome of the beſt Flowers; and the beſt Time wherein to do this is *April*. I am aware that Floriſts have every one their *Noſtrum* of prepar'd Earth for the Seeds of theſe Flowers: But if Diſcretion do but guide the Floriſt with a View of chuſing ſuch untried Earth out of Meadows as is of a *holding* Nature and rich, I am ſure he cannot err. *Pots* are too little; I ſhould rather adviſe to ſow the Seed in large ſquare Boxes ſet up to the Brim in the Earth under ſome well ſheltered South Wall. The next Year they may be removed, and the Year after may give you Hopes of ſeeing ſome new Varieties.

I am not ſufficiently ſatisfied about the new Syſtem of the Generation of Plants from Impregnation, as firſt communicated to the Royal Society by Mr. *S. Moreland*, and afterwards explained by Mr. *Balle* and Mr. *Bradley*. The Syſtem is pretty and rational: There wants farther Experience, and ſome Objections to be removed, before a Man not overhaſty can *give* into it. It is however upon the Foot of this Conjecture, that Mr. *Bradley* adviſeth the curious Floriſt to plant of every good Sort of his double Carnations in Beds on a Line in the Middle, and on each Side of them to ſet at leaſt two Rows of ſingle ones of choice Colours, and among them ſome Plants of the *Sweet William* and of the *Indian Pink*, which have ſuch Varieties of odd Colours in them. The *China Pinks* and the *Sweet Williams* bearing ſingle Flowers as well as the ſingle Carnations, *may have* Opportunity of communicating their *Farinam* into the Cells of the double ones, and *ſet* their Seeds; *which if they do*, we ſhall not only gather a larger Quantity than we could otherwiſe expect, but likewiſe be aſſured of great Varieties from them. Doubtleſs Mr. *Bradley* having ſince this firſt Conjecture, had many Years wherein to try his Experiments, and to improve Vegetables, will quickly give us a Hiſtory of his Succeſs, and a Catalogue of new Fruits as well as new Flowers.

In the mean Time we muſt be contented with the old Way of trying our Fortune, by ſowing the beſt Seeds on the propereſt Soils we can get; and to nouriſh and explain the Flowers obtained, either from the *Seed* or by *Layers*, by ſuch ſuitable Mixtures of Earths as have been found beſt to anſwer the Expectations of the Curious.

It is by no Means ſo difficult to explain *well* the ſeveral Stripes of the ſmaller *Picketees* and *Painted Ladies*, as it is to explain *fully* and *largely* the Flowers of the biggeſt Size, which is at preſent the great Emulation that Floriſts are got into. It is not ſo much how *good*, but how *big* is your Flower? Not but that all are agreed to commend the *Bonum Magnums*, and to extol them if they are *good* and *great* too. The great Myſtery of obtaining the End of a large-ſized Flower, I take to be in the *Soil*, the *Situation*, and *ſeaſonable Wat'rings*.

The proper *Soil* for a good and large Flower ſhould be betwixt the two Extremes of Clay and Sand, that is, of a loamy Nature, and yet moſt artificial Earths are *too dry* and *too rich*. Some I have known have had great Succeſs by taking out of Ditches ſuch drift Earth and Sand as have been waſhed by Rains off the neighbouring Fields; and with this alone have done Wonders. They who had rather try Mixtures, muſt be ſure to have all their Dungs well rotted and mellowed by Time, and to remember that too great *Riches* is as bad as *Poverty*. After theſe Hints about Soils, I may well enough leave the ingenious Floriſt to his own Diſcretion.

The *Situation* for a Flower in the Winter and Spring cannot be too hot: But after the Equinox is paſt, I ſhould rather chuſe to let the Carnations in Pots to have only the Benefit of the Morning Sun till Noon, and be as little expoſed to the mercileſs Winds as poſſible.

Seaſonable Wat'rings (eſpecially for ſuch as are in Pots) is the laſt Thing to be carefully minded; and *too much here* is alſo as bad as *too little*. But as Pots are on every Side ſurrounded either by the Sun or hot Air, whereby the Earth within is quickly deprived of its Moiſture, therefore proper Seaſons muſt be watched to give them the Supply wanted; which is beſt done by Water impregnated with Sheep or Deer's Dung. After which it is a very right Practice of ſome to lay ſhort green Graſs on the Surface of the Pot round about the Flower, to keep the Sun from exhaling too ſoon the Moiſture.

It ſeems hardly needful to ſay, that if a Flower be expected to blow very large, no more than one Stem with its Flower ſhould be ſuffered to remain; becauſe Reaſon teaches that *one* will be better fed and nouriſhed from the Root than *many*; and this *one* muſt be well ſupported by a Stick. About ten Days before the Flowers open themſelves, all the round podded Kinds (which are indeed the largeſt) will begin to crack their Husks on one Side or other; and then it is that the diligent Hand of the careful Floriſt is expected: For with a Glover's Needle he ſhould now ſplit or open the Husk on the oppoſite Side to the natural Fraction, and about three or four Days before the complete opening of the Flower, muſt cut off with a Pair of ſharp Sciſſars the Points on the Top of the Flower-pod, and ſupply the Vacancies or the Openings on each Side, with two ſmall Pieces of Vellom or Oil-Cloth, which he may eaſily ſlip in between the Flower Leaves and the Inſide of the Husk; by which

Means the Bloſſom will diſplay its Parts equally on all Sides, and be of a regular Figure.

Some have contrived to ſupply the Defect of burſting Flowers by applying a Piece of Gold-beater's Skin to the Outſide, which if it goes quite round, and laps a little over, will confine the Flower within its proper Bounds, and yet give it Leave to explain it ſelf; eſpecially if the Extremities of the Husks be cut off with a Pair of Sciſſars.

Pink. The *Pink* being ſo near a-kin to the *Carnation*, it is neceſſary that I ſay ſomething of it in this Place. It hath great Varieties, and is chiefly propagated for Borders in large Gardens. Some are very double, and ſtrip'd with pretty Eyes of ſeveral Colours; others are ſingle and ſtrip'd with good Eyes: They are eaſily propagated both from the Seed and the Roots, which may be parted in the Spring; but from the Seed are every Day produced new Flowers, which are hardier and kept with leſs Care than the *Carnations*: But *both* are ſubject to be deſtroy'd by Earwigs, which may be catch'd in Hoofs of Animals put on the Tops of Sticks. The *German* and *Poets Pinks* are both highly eſteemed, and deſerve the Care of the Floriſt; the *firſt* for its flaming red Colour, and the *other* for its deeper red, which is ſometimes mixt with white. Theſe are alſo raiſed from Seed and Slips.

Stock-Gilliflower. The excellent Property of the *Stock-Gilliflower* is, that with Care it may be made to blow almoſt all the Year; and a more fragrant and delightful Scent hardly any Flower affords; it is apt to be much hurt and often kill'd by the ſevere Froſts of the Winter: To prevent which, the beſt Way is to ſow them not 'till after *Midſummer*; for the bigger the Plant is, the leſs it will endure the Winter. After they are two or three Inches high, they ſhould be remov'd at ſix Inches aſunder, under a South Wall, and there abide 'till the Beginning of *April*, and then they may ſafely be removed to the Places where Beauty and Fragrancy are expected.

There are ſeveral Kinds of this pretty Flower. Some, and indeed the moſt, are ſingle; ſome *crimſon*, ſome *white*, ſome *purple*, ſome *red*, and ſome *ſtrip'd* with white; and from theſe (eſpecially ſuch as have ſix or ſeven Leaves) are derived by the Seed all the ſeveral double and ſtrip'd ones of the aforeſaid Colours; for the double ones bear no Seed. Of all others the red *Brompton Stock*, when it comes double, eſpecially if double and ſtrip'd, is eſteemed the greateſt Beauty. I once accidentally met with in my own Garden a Sort with moſt beautiful ſtrip'd Leaves of the purple Flower, which liv'd with me a Year in its Glory; but being weaker than the other Sorts, the next Winter took it off; and I have never met with another ſince. The *yellow Stock* is a pretty great Rarity, but there are of them both ſingle and double. But when the double ones of all the beſt Kinds are obtained, the ſureſt Way to preſerve the Kind is to *ſlip* them; *i. e.* to take ſuch Slips from the Side of the Plant as do not put forth Flowers; then ſlit the Bark at the lower End in four Places, raiſing it up a little with the Point of a Knife, and ſo ſet it in light Mould in the Shade, watering it as Occaſion ſerves.

This Plant ſeldom continues more than two or three Years; and the more it blows the ſooner it dies. Even the firſt Year of blowing, if it continues to flower late, it will go near to die, except the Winter be very favourable; to prevent which therefore the beſt Way is to *head* it, that it may in *Autumn* put forth new Shoots for flowering the next *Sum-*

mer. The *Brompton* large Kind is the hardeſt to be preſerved, eſpecially the double Sort, for that it quickly bears itſelf to Death.

Mr. *Bradley*'s Advice of *Inarching* the *double and ſingle Stock-Gilliflower* on the *Wall-Flower* might eaſily be try'd, and may probably enough ſucceed as to Growth; but neither the Colour nor the Duration of the Flower can well be expected to be altered. However it is good to try, that we may know every Power of Nature.

I cannot forbear mentioning the Difficulties I laboured under at *Telvertoft*, where I ſeldom or never could Winter the *double Bromfield Stock* by Reaſon of the Coldneſs of the Soil and Climate. Lat. 52°. 30′. And yet ever ſince I came into the *Biſhoprick of Durham*, no Winter hath hardly hurt them; but the Warmneſs of the Soil hath preſerved them, and they blow early in the Spring with Strength and Vigour. Lat. 55°. Without any Regard to the Age of the Moon, it is good to ſow the Seed at three or four ſeveral Seaſons, and the older the Seed is the better, if it will but grow; after three Years it commonly periſhes in the Ground.

Wall-flower. The *Wall-flower* is ſo near a-kin to the *Stock Gilliflower* that little further need be added to direct its Cultivation; for what regards the one ſerves the other, ſave that the *Wall-flower* is much the hardier Plant and of longer Coninuance. There are ſeveral Sorts found in the Gardens of the Curious beſides the *common yellow* ſingle Sort, which chuſes to grow in Clefts of Walls and other dry Places, from whence it takes its Name. For the *double yellow* is ſtill better than the *ſingle*; and the rarer Sorts ſtill are, the *double yellow* with variegated Leaves, the *double white*, the *bloody Warriour*, whoſe Flowers are *yellow* tinged with *red*, and another ſingle one, variegated with *yellow* and *brown*. They all bloſſom much about the ſame Time, *viz.* the three Spring Months. All the ſingle Sorts propagate themſelves faſt enough from Seed, and the double ones are eaſily encreaſed from Slips well watered. With Reſpect to this as well as the *Stock-Gilliflower* it is good to change the Seed with ſome Friend at a Diſtance whoſe Soil is different; for the *ſame* Seed in the *ſame* Soil repeated commonly degenerates.

French-Honyſuckle. The *French Honyſuckle* bears Spikes of purple or yellow Flowers; bloſſoms above a Foot high, and make a goodly Shew. It is commonly raiſed from Seed in the Spring, but will not blow till the ſecond or third Year. 'Tis an hardy Plant and will live ſeveral Years.

Cardinal Flower. The *Cardinal-Flower* is a Plant which hath large Leaves, whence ariſe tall Stalks growing ſmaller upwards, on the Top of which there are Flowers of five Leaves. There are two Sorts of them brought to us from the *W. Indies*. The one blows near three Foot high moſt beautiful Flowers of a ruby Colour, the only two Foot high bears pink coloured Flowers, both bloſſoming all *Auguſt* and *September*. The Seed is very ſmall and ſhould be ſown on the Surface of fine Earth in a Hot-bed, beaten down with the Back of a Trowel. The Curious complement this Flower with a Pot, to ſhelter it in Winter from ſevere Froſts. It may alſo be increaſed in *April* by parting the Roots, or in rainy Weather in *Auguſt*.

Hyacinth. The *Hyacinth* or *Jacinth* is of diverſe Sorts, ſome of which are but of little eſteem, and therefore I ſhall mention only ſome of thoſe moſt regarded, which are as follow. The *party Coloured*, the *Aſh-coloured*, *Calcedonian* or *Turkey Hyacinth*; the *blue Roſemary coloured*; the *Orien-*

tal, the *Polyanthos*, the *Starry Hyacinth of Peru*, the *Grape-flowered*, the *red*, the *roſe*, the *violet*, the *Spaniſh* and *Szenica Hyacinths*. Theſe have alſo great Varieties of Colours, and ſome double and ſome ſingle.

Theſe bear well enough our Winters and all of them, except the *Peruvian Hyacinth*, blow pretty early in the Spring, and are well ſcented: They may be either raiſed from Seeds or planted from Off-ſets in Autumn. The Bulbs that are produced from Seeds do not bear Flowers till the third Year; nor do they always come up of the ſame Colour with thoſe from whence the Seed was taken. So that the beſt Way to be ſure of your Sorts is to plant from the Bulbs or Off-ſets. Moſt Hyacinths delight in a hot Expoſition and a light warm Earth; and ſhould ſtand four Years in the Place without being tranſplanted.

Collumbine. The *Collumbine* is a Flower that may be either raiſed from the Seed or removed from Place to Place, for it will continue ſeveral Years. The Seed ſown in *April*, will bear Flowers the ſecond Year: There are ſeveral Sorts of this Flower, with Reſpect both to their Form and Colour. The ſingle ones of any Colour are not much regarded; but the *double ones* (which alſo bear Seed) ſhould be carefully preſerved, by rooting out the *ſingle ones* whenever they are diſcovered. Some of theſe *double ones* are alſo prettily variegated, ſometimes partly *red*, partly *blue* or *purple*, partly *crimſon*, partly *cheſnut*, and partly *white*. The Roots will continue three or four Years; but like moſt other Flowers, they are apt to degenerate unleſs the Seed be changed. For Want of an Opportunity of doing this, I my ſelf outlived the beſt Collection of Collumbines I ever ſaw, whilſt in *Northamptonſhire*.

Iris. The *Iris* or *Flower de Luce* is of an antient Family and a numerous Tribe, is both of the bulbous and tuberous Kind, and is therefore beſt propagated from thence, tho' it may alſo be raiſed from the Seed in Autumn. There are ſome of them of the tuberous rooted Kind, which increaſe exceedingly in good Ground. Theſe are propagated as the former, and are to be taken out of the Ground when the Leaves begin to dry; and after they have been kept ſome Time in the Houſe are to be replanted in *September* or *October*. Tho' there is not ſo great a Variety of theſe as of the bulbous ones, yet they afford many curious Flowers; the beſt of which is the *Calcedonian Iris*, and a more lovely beautiful Flower the Sun cannot ſhine upon: It is of a darkiſh Colour but prettily marbled. Like other Beauties 'tis ſomething tenderer than the reſt, and may well expect an agreeable Care and Management, *viz.* to be planted in a warm and rich Soil, and to be defended from Cold. There is a leſſer Sort of this not much different, only the Flower darker and not ſo well marbled. They flower in *May*, ſooner or later, as the Spring is backward or forward. Some think it beſt to take up the Roots at *Midſummer* and keep them dry till *October*, which makes them the apter to bear Flowers.

As to the bulbous Kinds, (of which the *Perſian Iris* is the chief, whoſe Flowers are of a pale sky Colour) they require a light Soil and to be ſet in the Shade, otherwiſe their Flowers wither away preſently: In replanting theſe bulbous rooted Iris's Care muſt be taken not to break the Roots.

Corn-flag. The *Corn-flag* or *Gladiolus* and the Varieties thereof are of no great eſteem; yet becauſe they come in a Seaſon when there are not many other Flowers, ſome of them ſhould be admitted into the Garden. Theſe three are the chief; the *Conſtinopolitan* having Flowers of a deep red with two white Spots within the Mouth of every Flower; the *Corn-flag* with a bright red or carnation-coloured Flower; and the Corn-flag with the *white* or rather *Aſh-coloured* Flowers. They flower in *June* and *July*, and will grow and increaſe almoſt any where.

Orchis. The *Orchis* or *Bee-flower*, though it grows wild in many Places, yet for Varieties Sake is received into Gardens for the Beauty of the Flowers; eſpecially the *Bee-flower* properly ſo called, foraſmuch as one of the Leaves of the Flower is in Form and Colour ſo like to a *Bee*, that any one unacquainted therewith may eaſily miſtake it for a living *Bee* ſucking a Flower. The *Fly-Orchis* is like the other, only the lower Leaf is like a Fly with Legs, and hath a Liſt of Aſh-colour and black. There are many other Varieties of *Orchis* and *Satyrions* diſtinguiſhed by *Male* and *Female*, as the one reſembles the Face of a *Man*, and the other of a *Woman*. There is alſo the *Grat* and *Butterfly* Kinds; the *white*, the *all red*, the *yellow*, and divers that are *ſpotted*; all which are found wild in ſeveral Places, in the South and Weſt Parts of *England*.

They flower about the Middle of *May*, if they be but ſet in a barren Soil; for the Sun and a rich Earth deſtroy them. They ſhould indeed be dug up where they are found with a Turf about them, and ſo planted altogether after they have done blowing.

Frittillaire. The *Frittillarie* bears a Flower in *April*, checquered with two or three Colours, ſometimes *white* and *red*, ſometimes *green* and *brown*, and ſometimes *yellow* and *black*. The *Hollanders* have raiſed great Varieties from the Seed, and their Way of doing it is ſomething ſingular. They take away the Earth where they intend to ſow them four Inches deep, then lay flat Stones or Tiles at the Bottom; upon which they ſift a *Stratum* of fine Mould of four Inches, whereon the Seed is ſown very thin, which is to be covered about half an Inch with the ſame ſifted Mould. By this Means the Bulbs are hindered from ſtriking downwards, and thereby grow much bigger.

But the moſt common Way is to multiply them by their *Roots*, which are ſmall and round, of two Pieces, as if joined together. The beſt Time of removing is in Autumn, before the Colds come on. The ſeveral Kinds have their ſeveral Times of blowing, from *March* to the End of *May*. *N.B.* The Smell of ſome of the *Frittillaries* is very offenſive, and none of them ſweet.

Globe-Flower. The *Globe-Flower* is introduced into Gardens out of the Meadows; only when it is found *double* it is much admired for its beautiful pale *French* yellow: It will grow almoſt any where, and may be parted at the Roots in *March*.

Star-Flower. The *Ornithogalon* or *Star-flower* is called by moſt of late, the *Star of Bethlehem*, of which there are great Varieties; ſome of them very pretty Flowers, and others not worth the naming. The great *white Star*, and *yellow Star of Bethlehem*, the *Ethiopian*, *Neapolitan* and *Arabian* Star-flowers are the chief that are valuable. The firſt conſiſting of ſix white Leaves, which ſpread open like a Star, flowers in *June*. That of *Naples* and the *yellow* in *April*. The *Arabian* flowers in *May*; but the *Ethiopian* not till *Auguſt*. But there is ſtill the *Indian Starflower*, much eſteemed for a fine Plant, having at the Extremity of its Stem a pointed Ear, which diſcovers ſeveral *white* Flowers with a *green* Button in the Middle. This Plant coming out of a hot Countrey ſhould be uſed tenderly, and in a Pot with fine untried Earth, that it may be removed from the extreme Froſts; which is a Compliment both the *Arabian* and *Ethiopian* expect, for they are alſo tender. The Roots loſe their Fibres like Tulips, and may be taken up as ſoon as the Stalks are dry, and kept out of the Ground till the Beginning of *October:* But the late Blowers, only for the Sake of propagating them, muſt be removed only for a ſmall Time.

Geranium The *Geranium*, or *Cranesbill*, ſo called for that the Seeds ſomewhat reſemble the Bill of a *Crane*, is of ſeveral Kinds; ſome of them brought from *Africa*. Of which the largeſt Sort called *Arboreſcens Geranium* is moſt remarkable, riſing near three Foot high, ſmelling like *Rhubarb*, and bearing large Bunches of purple Flowers variegated with darker Colours, and bloſſoms from *July* to *September*. There are many Sorts of this Flower, moſt of them of little Notice, except it be the *African* Sort, anſwering its Name *Nocte olens*, remarkable for its perfumed Smell in the Night, or after Sun-ſet. It has a great Root like a *Peonie*, with large jagged Leaves, and flowers in *July*. The Leaves are ſmall, of a purple Colour liſted about with yellow. It is a tender Plant, and for that Reaſon ſhould be ſet in a Pot. And foraſmuch as too much Moiſture is apt to rot the Roots, it muſt be kept dry and houſed in the Winter. It may be raiſed either from the Seed or Slips.

Anemonie The *Anemonie* is one of the favourite Flowers of the curious Lovers of the Flower-Garden for the great Variety of Beauties which it exhibits. They are both ſingle and double. The *former* is little valued; only for the Sake of the Seed which it produces (few of the double ones bearing any) *ſome* are preſerved, whereby new Sorts are attained. The Colours of this pretty Flower are various, *viz. red*, *purple*, *ſcarlet*, *Pink*, *Peach*, *white*, *aſh-coloured*, and ſome *ſtrip'd*. The beſt and moſt perfect *Anemonies* are ſuch as have Stalks that will ſupport the Flower without much *bending*, that have buſhy Tufts and curled Leaves of two Colours. The chief Time of their blowing is in *March* and *April*; and if they are ſet in Beds by themſelves, (free from cold Winds, their mortal Enemy) they diſcover a great deal of Glory.

This Flower is propagated both from the *Seed* and the *Roots* or *Phangs*, which are flat and of odd Figures. The Roots are to be taken out of the Ground in *June*, and laid by on dry Boards till *October*, when they are to be replanted as *Ranunculus*'s and *Tulips*, and indeed require much the ſame Management and Culture. For a late blowing their replanting may be deferred till *Candlemas*; but *theſe* muſt not be expected to be ſo ſtrong and bold. They love a rich dry Soil, and no artificial Compoſition can be better than *Untried Earth* of that Quality: But always remember that too much Wet is very prejudicial to the Phangs or Flaps of the new planted *Anemonie*.

As to its Propagation from Seed in the Nurſery, ſome Diligence and Curioſity is required. Boxes filled with fine rich ſifted Mould are beſt for theſe ſmall tender Seeds, which are to be carefully minded, and gathered the latter End of *May*, for the Wind is apt to carry them off. The Seed may be ſown in *February* or *March*, and they will ordinarily bear the ſecond Year, and produce vaſt Varieties. If the Leaves of theſe Flowers prove few, and their Stalks ſhort, you may be aſſured they diſlike the Soil, and then they ſhould be removed to richer and lighter, which may be done as ſoon as the Leaves turn yellow, and before they are quite dry.

Tulip. The *Tulip* is another Flower of great Glory, and of high Eſteem amongſt the Curious. Than whoſe Culture nothing hath been more ſtudied of late Years, and nothing at preſent ſeems better underſtood. The *Dutch* Merchants have made themſelves famous for their *Breeders* of Self-Colours, from which have been produced the moſt glorious and elegant Beauties of ſeveral Colours, dazlingly fine, and agreeably mix'd. Their Extravagance in purchaſing theſe Curioſities is very extraordinary, tho' perhaps not ſo great at preſent as it has been, when it is ſaid 100 *l.* hath been given for a ſingle Root, and a Lady's Fortune of a 1000 *l.* has been paid in ten of theſe Roots.

Mr. *Bradley* has made the moſt accurate and ingenious Remarks on the Nature of Tulips of any other who has wrote on that Subject. His Obſervation of the annual dying of every old Root, and the Reſurrection of two or three others in its Stead, ſeems to be wholly new. We may doubtleſs depend upon his Relation of the Fact, and then his Obſervations and Inferences are right. (1.) That the *Flower-Stem*, the *Leaves*, the *Flower* and the *Seed* are all perfected from that very Root which is put into the Ground. (2.) That the Sap circulates through the whole, by the waſting of the old Root and the Growth of the new one, both of them correſponding immediately with the Flower-Stem. For the new Root has no Fibres to take in Nouriſhment from the Earth, and ſo to make it grow; and therefore it cannot be nouriſhed any other Way than from ſome Veſſels in the Stem by the returning of the Sap. (3.) That the Change in the Stripes of the Flower are to be expected from the new Root, after they are ſeparated from the old ones, and have received their Virtue of being tinged from the Soil they were planted in; (ſuch as *old Lime* and *Stone Rubbiſh)* ſo that the Alteration is not to be expected the firſt Year.

The Time of the flow'ring of Tulips is *March*, *April* and *May*, according to their ſeveral Kinds. But a Lover of Order and Oeconomy will always take Care to ſet the ſeveral Kinds in Beds by themſelves, whereby he may expect a Succeſſion of Beauties. The uſual Claſſes into which theſe beautiful Flowers are commonly ranged, are, (1.) The *Agates*, which grow upon ſhort Stems, and are veined only with two Colours. (2.) The *Bagates*, which riſe the talleſt, and are commonly marbled with *purple* and *white*. And (3.) The *Beazarts*, which have four Colours tending to *yellow* and *red* of ſeveral Sorts. The Names given to every one of theſe ſeveral Sorts are perfectly arbitrary, taken either from Perſons or Cities, *&c.* So that it would be to no Purpoſe as well as endleſs to recite them.

Every one knows that they are propagated and encreaſed both by the *Roots* and by the *Seed.* The firſt Way they are multiplyed exceedingly, if, (as is uſual) they are removed every Year. But thoſe who have made curious Obſervations, think it better to let them continue two Years before they make a Remove, finding ſuch a Practice to make them blow much the fairer. The Time of removing is as ſoon as the Flower is quite fallen: For to let the Seed-Head ſwell is thought to weaken the Root. After they are out of the Ground they ſhould be rubb'd clean with a dry Cloth, and then laid upon dry Shelves, (where yet the Sun ſhould not reach them) till the Time of planting, which is *October*.

The raiſing them from Seed is tedious; but yet many have thought themſelves well rewarded for their Pains and Patience that Way. The Seed of the beſt and moſt perfectly ripe Tulips is to be choſen, and then ſown in a Bed of fine untried Earth of a mix'd Sort: *September* and *October* are the Times of ſowing, and they will begin to peep in *March* following. In the Seed-Bed they ſhould remain two or three Years, and then ought to be removed into freſh Ground, and ſet at proper Diſtances, waiting for their blowing about the fifth Year.

Cold Winds and ſtrong Clays are great Enemies to the well blowing of Tulips. The *Portugueze* and *Flemings* are ſaid to be the firſt that brought the finer Sorts into *Europe* from *Turkey* and the *Eaſt Indies*; but at preſent the beſt are to be found in *Holland*. The beſt Way to prevent their degenerating, as well as to obtain the End of Variety of Colours, is to diverſify the Soils in which they are planted and tranſplanted. And ſome ſay ſteeping the Seeds in ſuch Water-Colours, as you have a Mind ſhould prevail, will facilitate this Work; but of this ſome much doubt.

Ranunculus. The *Ranunculus* is another curious and beautiful Flower, which requires much the ſame Care and Culture with the two former; only being ſomething tenderer requires a warmer Situation, and a richer Soil. The Beauty of this Flower, and its ſtrong Colours, are ſurpaſſingly fine, even above all others that adorn the Flower-Garden; and if it were odoriferous as the Carnation, it would be deemed a Maſter-piece in Nature. There are great Varieties of them brought every Year from *Turkey*: But there are alſo every Year raiſed from the Seed amongſt us as good, if not better. For Mr. *Bradley*'s Extaſy was very great, when he beheld the ſurprizing Productions of Nature in the ſeveral Sorts of theſe Flowers in Mr. *Potter*'s Garden at *Mitcham*, where he had obſerved, that from the cleareſt *white* to the darkeſt *Purple*, (excepting only the Azure blue) there wanted none to carry them thro' all the Colours to the deepeſt *black*, all raiſed from Seed. The ſelf-coloured *Scarlet* (tho' the old Sort and *now* common) when ſet in Numbers or Rows, do wonderfully ſtrike the Eye, and dazzle it with their Luſtre, eſpecially at a Diſtance; whilſt moſt of the other Sorts expect and well enough bear a nearer View.

This Flower is of a very unſociable Nature, and will not thrive mix'd with or ſtanding near any other Sort. Its Phangs, ſomething imitating Claws, has occaſioned it to be called a *Crows-foot*. The time of planting them is from the Beginning to the End of *October*, in a ſhelter'd Place, expoſed to the hotteſt Sun, and in as fat and rich a Soil as poſſible; ſkreened untried Earth, and well rotted Dung, equal Quantities I have found to be very agreeable to them, eſpecially if on the Top be ſtrewed ſome fine Pidgeon Dung; which not only enriches the Soil, but keeps them warm, and thereby preſerves them from the extreme Colds in the Winter, which ſometimes deſtroys them.

The Phangs muſt be ſet with the Claw downward, two Inches deep and four Inches aſunder, in exact Rows. Thoſe which are planted in Autumn will flower in *April* and *May*: But the great Admirers of this Flower reſerve ſome Roots to be planted in *March*, and theſe will diſcover a new Glory about *Midſummer*; which yet will not laſt ſo *long*, by Reaſon of the Heats, nor appear ſo *large.* If the Seaſon is dry when they diſpoſe themſelves for flowering, they ſhould be frequently water'd, and kept free from Weeds, which are great Enemies to them.

Beſides their Increaſe at the *Roots* (which muſt every Year be taken up as ſoon as the Stalks turn yellow, and houſed like Tulips) they may likewiſe be raiſed from the *Seed*, which ſhould be ſown in the Spring, in fine Mould, and under a hot Expoſition. The *double white* Sort ſhould not be taken up till *September*, when its Phangs are to be removed and replanted immediately. Both the Flower and Stalk are found injurious, if not *mortal* to all Sorts of Cattle: And this Caution may be a ſufficient Warning where to beſtow them when taken up.

Cyclamen. The *Cyclamen*, called alſo in Engliſh *Sow-Bread*, becauſe Swine feed upon it, is a large bulbous-rooted Plant, bearing ſmall Flowers, ſome *fleſh-Colour*, ſome *purple*, and ſome *yellow*, riſing not above four Inches from the Ground with large mottled Leaves. Some of them flower in the *Spring*, and others in *Autumn:* And according to the Times of their flowering, ſo ſhould their Seed be ſown, which is the beſt Method of increaſing them. The Singularity of this Plant is that it firſt forms its *Bulbs*, and afterwards its *Flowers*, before the *Leaves* appear. Altho' they are commonly raiſed from Seed, yet they may be alſo propagated from the Bulbs or Roots cut in Pieces either in *April* or *July.* That with the *purple* Flower is ſometimes found double; and the *white* Kind (which is ſweet ſcented) is ſomething tenderer than the reſt. But indeed all of them are ſometimes affected with a hard Winter.

Hellebore. There are ſeveral Sorts of *Hellebores*, all of them hardy Plants, and ſome of them growing wild in the Fields and Woods. The *black* Sort is called the *Chriſtmas-Flower*, becauſe it is wont to blow about that Time, and continues blowing till *February*, having a *white* Flower. There is another with *greeniſh* Flower, and a third with a *yellow* one, not ordinarily to be met with. They may be encreaſed from Off-ſets and parting their Roots, either in *September* or *March.* The Leaves themſelves are a pretty Ornament, and the large Spikes of their Flowers beautiful for their odd Colours; but they die to the Root in Winter.

Ladies Slipper. But there is a Species of this Plant called the *Helleborine*, or *Ladies Slipper*, which bears two or three Flowers one above another, in an Oval Form, with the upper Part hollow, thereby ſomething reſembling a *Slipper.* The Flowers are ſometimes of a *pale yellow*, and ſometimes *brown* tending to *purple.* There is alſo a ſmaller Sort with a *white* Flower, and another with *purple.* Pretty as they are, many of theſe are found in divers Places of *Yorkſhire* and *Lancaſhire* growing wild. They bloſſom in *May* and *June*, and thrive beſt in a Soil not over fat, nor too much expoſed to the Sun.

Bacchus bole. The *Bacchus-bole* is not much regarded, but for Varieties Sake is ſometimes admitted among the reſt. It has broad Leaves, and Flowers *purple* colour'd and *white.*

Jonquil. The *Jonquil* is of the Narciſſus or Daffodil Kind, and are of ſeveral Sorts, having bulbous Roots like Tulips, but ſhould not be removed but for the Sake of multiplying. The *ſmall Jonquil* with a *yellow* and *double* Flower, bloſſoming in *April*, is moſt eſteemed and admired for its beautiful Scent. The *great Jonquil* hath alſo ſweet *yellow* Flowers growing one above another like a Tuberoſe. There is alſo a Sort which blows in Autumn with *white* Flowers a little ſcented. But all the Sorts which blow in the Spring have *yellow* Flowers, or inclined to *yellow*. Theſe Flowers are ſomething tender, and apt to be hurt as much by the ſcorching Heat of the Sun as by the Winter-Colds. They may be encreaſed by the Seed ſown in the Spring, but the beſt and moſt expeditious Way is by the Bulbs, either in Spring or Autumn.

Baſſinet.

The *Baſſinet* is a Sort of *Ranunculus*, but more hardy and needs leſs Care. The ſingle and the double *yellow* flower in *April*. Theſe are called *Butter-flowers*, or *Gold Knobs*, from their beautiful yellow Colour. But there is a ſcarlet one, whoſe Leaves are a little indented. They will thrive in ordinary Garden Mould, and make a pretty ſhew among the Flowers of the middle Size, and may be increaſed by parting the Roots.

Lilly of the Valley.

The *Conval-Lilly*, or *Lilly of the Valley*, is eſteemed to have, of all others, the ſweeteſt and moſt agreeable Perfume; not offenſive or overbearing, even to thoſe who are made uneaſy with the Perfumes of other ſweet ſcented Flowers. Many wonder how it comes to be called a *Lilly*, having no Kind of Reſemblance to any of the Sorts of that Flower. This ſhould have been more properly placed amongſt the *Reptiles*, it ſeldom riſing above four or five Inches from the Ground with its Stem, whereon are placed ſeveral ſmall *white* Flowers one above another. There is a Sort of them bearing Flowers of a pink Colour and larger Leaves, but leſs perfumed, which makes them leſs valuable; becauſe the only Beauty of this Flower is in its Perfume. They bear beſt in a ſhady Place, are eaſily propagated by parting the Roots, and they commonly flower in *May*. It loves not to be often removed, and ſhould be kept in Beds by themſelves: But when the Roots come to be too much matted, it is good to *thin* them, and to refreſh them with *untried* Earth.

Dog's Tooth.

The *Dog's Tooth* is of the *Satyrion* Kind, as the ſpotted Leaves and Roots manifeſt, but of greater Beauty and Rarity than any of the *Orchis* which grow with us, and therefore deſerve a Place in the beſt Garden. There are known with us four Sorts of the *Dens Caninus*, diſtinguiſhed by the Colours of the Flowers which they bear, *viz.* the *white*, the *purple*, the *red*, and the *yellow*. It takes its Name from the Form of the Root, which is long and white like a Dog's Tooth. It explains its pretty Flowers about the Beginning of *April*; are propagated from the Roots in *Auguſt*, which yet ſhould not remain long out of the Ground, nor at firſt planting be ſubject to too much Wet, which rots them. The beſt Roots are brought to us from *France* and *Flanders*; for it is very ſeldom that we can bring them to encreaſe well with us in *England*.

Spider-wort.

The *Spiderwort* is call'd by ſome *Bruno*'s *Lilly*, becauſe it bears Flowers on a Stem about a Foot high, like *Lillies* in the Form of a Bell; and its Root is like that of a *Turnip*. There are two or three Sorts of this Flower, *viz.* The *Savoy*, the great *Italian*, and the *Virginian Spiderwort*. The two firſt bear *white* Flowers, and the laſt of a *blue* Colour with red Threads in the Middle. It is multiplied by the Root, and flowers in *June*.

After theſe might follow the Deſcriptions of ſome other Flowers of the perannual Kind under this Claſs; ſuch as *Batchelor*'s *Button*, *Dittany*, *Paſque-Flower*, *Colchicum*, *Mandrake* or *Golden Mouſe-Ear*, *Satin-Flower*, *Golden-Rod*, *Double Pellitory*, *Double Featherfew*, *Double Camomile*, *Double Dog*'s *Fennel*, *Double Ladyſmocks*, *Scarlet Croſs*, *Gentian*, *Dames Violet*; with many others every Day introduced into Gardens from the Fields or Woods, which ſome late Authors have taken a great deal of Pains to deſcribe, and have laboured the Methods of propagating them, whilſt the Culture and Removal is eaſy, natural, and no ways difficult: I ſhall therefore content myſelf with having only juſt mentioned ſome of them.

CHAP. V.

Reptiles or the loweſt vivacious Flowers.

Auricula. THE *Auricula* or *Bear's-Ear* is juſtly valued and eſteemed by all Floriſts. For Nature no where diſcovers her Variety of Colours, her Shades and pretty Mixtures more than in this little Flower, which is raiſed both from the *Seed*, and from *Slips*. In the *former* Way have been raiſed of late Years a ſurprizing Variety of Sorts, which the Editor by Way of boaſting and triumph Names after ſome great Family or conſpicious Perſon. In the latter Way you are ſure to preſerve and propagate the Sort, with a little Care in removing and parting the Roots whilſt they are in Flower, (which I take to be much the beſt Seaſon) and then watering and ſhading them, if the Weather be dry, for three or four Days.

Thoſe who are curious in preſerving and boldy explaining the beſt Sorts put them in *Pots*, the better to preſerve them both in Winter and Summer. For the *Auricula* is a Plant that delights in the Shade; and too much Wet is apt to rot it in the Winter, and in the Summer to take off that beautiful *Powder* which ſo much adorns the Flower, and graces the *Eye* of it, which is eſteemed the Center of its Beauty, and therefore is much regarded. Thoſe therefore who take Pleaſure to defend Beauties from outward Injuries of Sun and Weather complement them with Sheds and Shelves of Boards one above another, facing only the *Eaſtern* Sun.

All the ſeveral Sorts of *Auricula*'s flower from the Middle of *March* to the End of *April*; and if the Weather be not very dry, moſt of them will blow again the Beginning of *September*; tho' their Flowers in Autumn are ſeldom ſo fair and large as thoſe in the Spring.

The Rules and Preſcriptions laid down for Soils, wherein both to plant and ſow this curious Flower have been various, according to Peoples different Fancies: But as it is a Plant that loves *Coolneſs*, well rotted Cow-dung with an equal Quantity of *Untried Earth* well ſifted, without any more adoe, is an experienced good Compoſition both for the *Flower* and the *Seed*.

Great Care ſhould be taken to preſerve the Seed from ſome of the beſt Flowers; for when the Stalks begin to grow yellow in *June*, and you diſcern in the Top of the Seed Veſſel a little *hole*, you may then be aſſured the Seed is ripe, and the Stalks fit to be cut; which yet you muſt be ſure to keep upright, leſt the beſt of the Seed ſcatter. Let them then lye in a Chamber expoſed to the Sun till the Beginning of *September*: and then ſow the Seed in the aforeſaid Compoſition put into flat ſquare Boxes with holes at the Bottom to let out the Water. After the

Seed is ſowed pretty thick, ſift more of the fine Mould over it about the thickneſs of a Crown P'ece, and there let it remain all the Winter in the Sun and Air till they begin to come up, which will be about *April*; and then the Box muſt be removed into the Shade and often gently watered. As ſoon as they are grown to any conſiderable Bigneſs, they ſhould be removed at proper Diſtances into Beds prepared for that Purpoſe, where they are to remain till they bear Flowers. Some of them will bear the Spring following, others in Autumn. The *double* and *ſtrip'd* Sorts muſt be often ſhifted elſe they will be apt to degenerate.

Polianthus. There are diverſe Sorts of this Flower, which appears early in the Spring, and ſome of them very pretty. There are of them both of the *Cowſlip* and the *Primroſe* Kind; Of both which there are great Varieties. Some are *ſingle* ſome *double* flowering; Some *Hoſe* in *Hoſe*; ſome *Pentaloons*; and ſome Feathers. The Way of increaſing, variegating, and diverſifying theſe is much the ſame as in the Article above; for they require the ſame Soil, and Culture as the *Auricula*, and they ſhould, like that, be frequently removed to freſh Places, if you would preſerve their Beauty and Colours.

Daſie. Altho' this be in all Places and Countries the moſt common plain Flower or rather *Weed*; yet even *theſe* when they are found double and variegated, they find a Place in the beſt Gardens, and make very beautiful and agreeable *Edgings*. There are thirty or forty Sorts of them; but the moſt Remarkable are the *double white*; the *double red*; the *double red and white*; the *Coxcomb*; the *Rain-bow*, and the *Hen and Chickens*. They are as eaſily raiſed from the Seed as parted from the Roots, and that either in *Spring or Autumn*. To preſerve their Colours and Beauty, they ſhould be taken up once in three or four Years. Too much Sun and Drought are Enemies to them; ſo that except they be ſet in the Shade, they expect the Refreſhment of Water in a dry Time.

Gentionella. This is another very pretty *Reptile*, and is indeed one of the moſt agreeable *bordering* Flowers. There are ſome varieties of it in foreign Parts, but I have not yet met with more than one Sort in *England*, *viz.* That with *dark blue* Flowers in the Form of a *Bell*. And the *blue* is indeed of that daz'ling Luſtre that none of the Painter's Colours not even the *Ultra marine* can vie with it. If it likes the Soil (which ſhould be light) it is apt enough to put forth Off-ſets, which may be parted from the Root either in Spring or Autumn.

Hepatica. The *Hepatica*, otherwiſe called *Liverwort*, from its ſuppoſed ſovereign Virtues in diſeaſes of the Liver, is a very pretty Flower, and the more ſo, becauſe it appears very early in the Spring, ſometimes the latter End of *January*, and it is remarkable that the Flower oftener appears on its naked Stalk before the Leaves. The *three* moſt remarkable Kinds of them, are the *ſingle and double crimſon*, the *ſingle and double blue or purple*, and the *ſingle and double white* Flowers. The *laſt* of which is the more rare and tendereſt Sort. They are ſeldom raiſed from Seed, but may be eaſily propagated in a light ſandy Soil by parting the Roots in Spring and Autumn.

Violet. The *Violet*, tho' it grows wild under Hedges, is yet admittted into the Garden for its Fragrancy; and hereby it is ſomething improved; for there are beſides the ſingle blue and white Kinds the *double white* and the *double blue* and the common Sort with Leaves variegated with green and white. This Flower blows in *February* and *March* and is beſt and moſt eaſily propagated by Slips and Runners from the Mother Plant.

Crocus. Of the *Crocus* or *Saffron-Flower* there are ſeveral Sorts, beſides thoſe which bloſſom in the Spring; of which we have the common yellow and black ſtrip'd; the plain Leomon coloured; the Orange coloured, the plain Purple, the motled Purple, and the white; which if they are planted in Beds by themſelves and diſcreetly mixt, make a moſt agreeable Shew in *February* and *March.* They proſper almoſt in any Soil, and encreaſe wonderfully at the Root. The *Saffrons* and *Colchicums* are all of the *Crocus* Kind, tho' they bloſſom not till Autumn. Of the firſt I ſhall ſay nothing here, having treated of it as a Field Plant, and cannot but wonder it is not made more ſo, conſidering the Profit it brings. But the *Colchicums* are pretty Flowers in Autumn, and appear not till after its large and flouriſhing Leaves die into the Ground. Some call it the *Reſurrection Flower*, as being a lively Image thereof. It makes an empty Flouriſh all the Summer with Leaves only, which after ſometime die and rot in the Earth; but at a certain Seaſon, riſes again with a more beautiful and glorified Body without Leaves. There are ſome different Sorts of them; ſome *ſingle pink*; ſome *double pink* coloured Bloſſoms; and others checquered with *pink Colour and white.* They have large Roots like *Tulips*, and by them they are propagated.

Snowdrop. This Flower obtains its Name, from its early appearance, even ſometimes in *December* and *January* before the Snows are quite diſſolved; and from its beautiful *white.* There are of them both *ſingle* and *double*; and they make a very agreeable Appearance at the firſt of the Spring, being ſet in Rows on the Borders intermixt with the Crocus's: And like them they are multiplied by parting their Roots either in Autumn or Spring.

Indian Pink. This Flower I ranged not with the other of its Name, becauſe it is a *Reptile*, and becauſe it is of a tender Conſtitution, requiring more and different Care. It was brought from *China*, and loves a warm Expoſition: And therefore for the Sake of its prettty variegated Flowers it is uſually ſet in Borders under a South Wall; where it will diſplay its Beauty for ſeveral Years. Tho' it is good every Year to ſow new ones from the Seed which it bears, leſt a ſharp Winter deſtroy the old Roots, as ſometimes it will.

Panſy. The *Panſy* is a Reptile of the *Violet* Kind; for its Stems are apt to creep on the Ground, and it bears Flowers not unlike the *Violet*, but they are commonly of three Colours, *viz. white*, a *yellow*, *purple* and *blue.* And when its Leaves are ſtrip'd with *yellow* (as ſometimes they are) it makes a very pretty Shew in Borders. It will outlive the Winter; but it ſhould be ſown anew every Year.

Aconite. The *Aconite*, to which the Epithete of *Winter* is uſually put, becauſe it diſplays its yellow Bloſſoms commonly the very Beginning of *January.* It is apt enough to overrun the Ground both by its Off-ſets and by its Seed, and therefore there is little need to direct any Method of Cultivation.

CHAP. VI.

Annual Flowers from the Seed.

Sun-flower. OF all the Tribe of *Annuals* this is the largeſt and talleſt. For it is even taller and larger than the *Perannual* one, which we have already deſcribed: If it be ſown in *March* in a rich Soil and well watered, it will riſe near eight Foot high on one ſingle Stem bearing ſeveral large yellow Flowers, ſome of which will be near a Foot diameter. Theſe are ſeldom admitted in ſmall Gardens; but in large ones (when ſet in Rows and at proper Diſtances) they make a glorious Shew.

Snapdragon. There are two or three Varieties of this Flower *viz.* The common *white*, the *variegated white*, the *yellow and the red.* They are raiſed from Seed; and altho' they have no great Beauty or Smell, they ſerve to adorn Chimneys and Flower Pots, and will grow almoſt any where, even on Walls. It is called *Calves-ſnout* or *Lyon*'s *Heart* from the Form of its Flower; which appears from *May* to *July*. The Seed which is ripe in *Auguſt*, may be ſown in the following Month or in *March*. It is a hardy Plant; but dies as ſoon as it hath produced its Seed.

Lark-heel. The *Lark-heel* or *Lark-ſpur*, ſo called from the Reſemblance its Flower hath to the Heel of the Lark, is a pretty Ornament in a Flower-Garden, where there is Room for it to extend its Branches. Otherwiſe they ſhould be ſown in Quarters by themſelves. Some of them are very double and prettily variegated, ſome blue, ſome purple, ſome white, and ſome Peach coloured. And when all the Colours are well mixt and the Flowers double and ſtrip'd with white, nothing can make a gayer Shew at a Diſtance. And it is multiplied by Seed ſown either in Autumn or Spring. But indeed it is apt enough to ſow itſelf in Autumn, and if the Winter prove mild, *ſuch* will flower in *May* or *June*, and then the Spring-ſowing will come a Month after. The Seed ſhould ſometimes be changed and fetch'd from a different Soil, otherwiſe they will degenerate, and become ſelf coloured and ſingle.

Poppy. The *Poppy* is one of the Wonders of Nature, that ſo tall and large a Flower ſhould ariſe from one of the ſmalleſt of Seeds in one Year; tho' it may be here obſerved that *Tobacco*, which hath ſtill a ſmaller Seed, doth yet produce a much ſtronger Plant. Were the *Poppy* as good as it is great, as ſweet as it is beautiful, and as laſting as it is haſty in Growth, nothing could be more glorious. But its ill Smell, and haſty withering makes it much leſs regarded. It may be ſown either in Autumn or Spring; but indeed this like the former ſows itſelf faſt enough and diſplays its Flowers in *May* and *June*, ſome red ſome purple, ſome white, ſome ſtrip'd, and ſome very double. There is a *Dutch* wild Poppy that blows not ſo high as this, whoſe Flowers are *red and white* ſtrip'd, and bloſſom from *June* till *Auguſt*. The *Argemone* being a Sort of Poppy, by Mr. *Tournefort* called the *prickly Poppy*, I mention under this Head: it comes up with a Stalk about a Foot high, with long narrow notch'd

Leaves: On the Extremities of the Stalk appear Flowers in the Form of a *Roſe*. The Seed is to be ſowed in Autumn, and tranſplanted in *April* into Borders, where they may attain their perfect Growth.

Candia Tuft. There are two Sorts of the *Candia Tuft*, differing only in the Colour of their Flower, the one *white* the other *red*. It brings its Flowers in Tufts in *June* and *July*, on a Stalk about a Foot high. It is raiſed from Seed, and may be ſown either in Autumn or Spring: But it is good to ſow at both Seaſons, that there may be a better Succeſſion of their Flowers. Some Authors affect to make a Buſtle about the Methods of cultivating them, as if they were difficult and tender, and wanted Coverings, Hot-Beds, and a more than ordinary Care, and better Soil; whereas it is an hardy Flower, and will grow almoſt in any Soil.

Double Marigold The *ſingle Marigold* is hardly worth mentioning as a Flower, but the *double one* is large and beautiful enough, making a goodly Shew with its deep *yellow* for ſeveral Months in the Year, and in the Winter too, if it be mild and open. It ſerves for all the ſame Uſes of the Kitchen and Dairy as the ſingle one, and may be raiſed from its own Seeds; but like moſt other beautiful *double* Flowers it degenerates, being conſtantly ſowed in the ſame Place and Soil.

Venus Looking glaſs and Venus Navelwort. This is a very pretty *Annual*, when ſown either on *Edgings* or *Spots*; for it ſtrikes the Eye agreeably enough with its *pale blue*, bloſſoming about Midſummer, and riſing not above five or ſix Inches: As doth alſo *Venus-Navelwort*, which hath *white* Flowers.

Parnaſſus. The Flower of *Parnaſſus* has Leaves like a Violet, and a Flower on the Top of the Stalk in the Shape of a *Roſe*, compoſed of ſeveral unequal Leaves all of them fringed, and placed in the Shape of a Round. It loves Moiſture and a holding Soil, but is ſometimes apt to be injured with Cold, eſpecially if ſown before *March*.

Muſcipula The *Catch-Fly*, or *Muſcipula*, is a Flower very apt to ſpread it ſelf without any Care, and indeed will ſoon over-run the Flower-Garden, if not kept within Bounds. It is however a pretty Flower, of a red or crimſon Colour, which appears in *June*, and continues blowing five or ſix Weeks, eſpecially if they out-live the Winter, as they commonly do. There is a glutinous Matter always ſticking upon its Stalks, which proves a Trap for little Flies, and hence it derives its Name. The Flower is ſweet, and looks well in Patches.

Flos Adonis. This Flower ſeldom riſes above a Foot high, and appears with its crimſon Flowers about Midſummer; it is hardy, and eaſily raiſed from Seed in Spring.

Nigella There are ſeveral Sorts of the *Nigella*, otherwiſe called *Fennel-Flower*. The ſingle Sort has large Leaves and *blue* Flowers; the ſmall leaved with *white* Flowers, and another from *Candia*. It is propagated from Seed commonly ſown in Autumn, that the Plants may be fit to be removed from the Seed-Bed into their proper Places in the Spring.

Lupine. The *Lupine*, becauſe it has ſome pretty Varieties, (as the great and ſmall blue, the white and the yellow) is uſually ſown with us as a Flower; but it is indeed nothing but a *Vetch*, and in the Southern Parts is ſown in the Fields as ſuch, and as Pulſe for their Cattle. *Pliny* in his mentioning this, affords us one (amongſt a great many other) Inſtance of his Readineſs to *give* into Superſtition and Fable, *viz.* That their Flowers keep their Courſe with the Sun; and that whether the Air be cloudy or clear, they ſerve inſtead of Dials for the Time of the Day: And likewiſe that they have ſome other Motions, by which as Prognoſticks the Husbandmen judge of the Weather.'

Scarlet-Bean.

The *Scarlet Bean* is another Kind of Pulſe introduced out of the Kitchen into the Flower-Garden. It is indeed one of the Kinds of Kidney Beans, whoſe Pods, (though ſome think them a little ranker than the white, yet) are ſingularly good uſed in Pickles. However it is now adopted for a *Flower*, becauſe of its beautiful *ſcarlet* Colour; and it is accordingly encouraged as ſuch to twine about Sticks ſet in Borders. Its Excellence is, that it will continue blowing from *May* till the Froſts come on. They are uſually employed to adorn Walls and Arbours.

Annual-Stock.

The *annual Stock* is another pretty Flower for *Edgings*, or to be ſown in *Spots:* It bears Flowers of a *Pink Colour*, ſometimes ſtrip'd with *white*, about Midſummer.

Viola-tricolor.

This is likewiſe called *Hearts Eaſe*; is a Dwarf, and makes a pretty Edging, having Flowers variegated with purple, yellow and red, about *June*.

Scabius.

I am afraid the Derivation of the *Scabius* from the Latin Word *Scabies*, as if it was an infallible Cure for the *Itch*, is not much to be depended upon; though the Botaniſts aſcribe a great many Virtues to this Plant, and fanſy it will cure almoſt any Sorts of Sores. However that be, it is a very pretty Flower in *Auguſt* and *September*. It makes no great Shew at a Diſtance, though it riſes on ſmall Stalks near three Foot high; but if it be viewed near at Hand, the little *white* Specks mix'd with the *purple* have an uncommon Beauty. There are chiefly two Sorts of this Flower cultivated amongſt us, *viz.* The *Spaniſh Scabius*, and the *Indian Scabius*, which laſt is much preferred for its ſweet Scent, called therefore *Musk Scabius*. The Seed may be ſown either in Spring or Autumn; but the beſt Seaſon for ſowing is in *September*, and then they will be ready to tranſplant out of the Seed-bed in *March*, to be ſet in their proper Places and Diſtances. There is a Sort called *Mountain Scabius*, with much larger Leaves, bearing Seed which ſhould be ſown in *March*.

There are ſeveral other Flowers raiſed from Seed of leſs Note; ſuch the *Pheaſants Eye*, *Royal Comfree*, *Mallows*, *Barba Jovis*, &c.

But I have no Inclination to weary the Reader about Trifles, and the Cultivation of Plants wherein there is no Difficulty, as ſome late Dictionary-Writers have done; making the Preſs groan, and the Patience of the Inquiſitive tired with *tedious* Repetitions, and *long* Directions how to cultivate a *Daiſy*, and when to ſow a *Cowſlip*.

CHAP. VII.

Of Annuals to be ſown in Hot-Beds.

OF this Race of Flowers we have, introduced amongſt us from foreign Parts, ſeveral pretty valuable Sorts, which I ſhould think deſerve a Place in the Hot-Bed altogether as well as a *Cucumber.*

French and African Marigold.

Amongſt theſe are the *French and African Marigolds*, which though they may be raiſed in the natural Earth, yet by Reaſon in that Way they will come late, and conſequently continue but a little while before the Froſts overtake them, it will be worth while to ſet them forward in an Hot-Bed.

The *French* Sort, called alſo the *Indian Roſe*, makes a very agreeable Mixture with other Flowers in Borders, with its variegated Velvet Flowers intermix'd with *yellow* and *red* Colours. For its *Duration* and *Beauty* no Flower exceeds it; but its very diſagreeable, not to ſay *ſtinking* Smell, makes it ſo offenſive to many, that they quite baniſh it from the Flower-Garden. Several Attempts have been made, firſt to remove its Smell, and then to give it an agreeable Odour; but hitherto they have not (as I can hear) proved ſucceſsful, though the Seeds have been ſteep'd in all imaginable Perfumes; ſo hard is it *quite* to mend or alter corrupt Nature! according to the old Aphoriſm.

Quo ſemel eſt imbuta recens ſervabit Odorem
Teſta diu.——————————

However, I ſhould not give this over as wholy deſperate, ſeeing it is certain we can heighten the Flavour of Melons, both by ſteeping the Seeds in rich Wines, and by artificial Preparations of Earth.

The *African* Sort is alſo a moſt beautiful Flower, if it proves *double*; and to make it ſo, the Seeds ſhould always be gathered from the *double* Sort.

This indeed hath but one Colour, but it is a moſt beautiful *yellow*, and the Flowers are much larger than thoſe of the *French* Sort. And although it has no good Smell, yet neither has it ſuch an one as to be offenſive, as the other is. It bears its long black Seeds in full Pods plentifully, which ſhould be gathered at the Approach of Winter, when the Flower dieth.

Both Sorts may be removed out of the Hot-Bed into their proper Places, the latter End of *April* or the Beginning of *May*, for they are not very tender.

Amaranthus.

The *Amaranthus*, otherwiſe called the *Flower gentle*, is chiefly of two Sorts, the *greater* and the *leſſer*. The beſt of the *greater* Sort, is the *large purple*, that bears long Spikes of round hairy Tufts of a reddiſh purple Colour, and from its bending its Head toward the Ground, is called by the common People, *Love lies a bleeding.*

Of the *leſſer* Sort, (much the tendereſt and moſt beautiful) there are great Varieties: The *Amaranthus Cocks-comb* of all the ſeveral Colours, *viz. red*, *ſcarlet*, *yellow*, if they have Juſtice done them by Removes from one Hot-Bed to another, are moſt eſteemed for their beautiful dazling Colours, for forming their Heads into the Shape of a Cock's Comb, and for their Duration, continuing in their Beauty from the Beginning of *June* till the firſt Froſts come on; before which their Seed ſhould be carefully gathered from thoſe that explain themſelves beſt. This Sort, tho' not near ſo large as the other, will ſometimes riſe near two Foot high; and when it is ſet in the richeſt Earth, in a good Expoſition to the Sun, and ſheltered from Winds, will make a moſt beautiful Shew, eſpecially if their Colours are ſorted with Art, and placed in Rows at equal Diſtances.

The *Amaranthus Tricolor* differs little from the former, ſave that its Beauty is chiefly in the Leaves, variegated with *green*, *red*, and *yellow*; which Mixture of Colours every one knows is beautiful enough. There is alſo another Sort of *Tricolor*, whoſe Leaves are *buff*, *red*, and *green*, but not ſo agreeable as the other. Theſe are ſomething tenderer than the *Cock's-combs*, and therefore ſhould remain longer in the Hot-bed before they are removed, and then treated with Care and Caution; for the leaſt Cold kills them. But yet they all abundantly merit the Eſteem, and diligent Nurture of the curious Floriſt; for indeed no good Garden ſhould be unfurniſhed with theſe beautiful Flowers, the chief and moſt deſerving of all the *Annuals*.

The Seed of theſe Flowers is of a bright ſhining black and ſmall, but of long Duration, continuing good ſeven or eight Years; which the curious Floriſt ſhould obſerve with Pleaſure; becauſe ſome Years will not bring their Seed to perfect Maturity, and then an old Stock is valuable. The Seed being ſmall, ſhould be ſown near the Surface in the Hot-bed, in very rich Mould, in *February*; and about the Middle of *March*, when the Plants have four Leaves, ſhould be removed into a new one after the great Heat is over; where they are to be nurſed with Care, letting them have as much Air and Sun as is conſiſtent with their tender Conſtitution. The *Cocks-combs* may be truſted abroad under a warm Wall and in rich Earth at the latter End of *May*; but it is beſt to keep the *Tricolors* under Glaſſes till the Middle of *June*; and even then, if they are removed into Pots, to let the Pots ſtand under Glaſſes for four or five Days.

Convolvulus.

The *Bind-weed*, or *Convolvulus* is of two Sorts, *viz.* the *greater* and the *leſs*. The *greater* riſes up with many long winding Branches above ſix Foot high, having at the Joints Flowers like Bells of a deep blue; which never open but in the Night, and cloſe again at Sun-riſe: As doth

The *Convolvulus Minor*, which hath ſmaller Leaves and a weaker Stalk, riſing (if ſupported) two Foot high. The Flowers are leſs than the other, but far more beautiful, being of a fair *Azure blue*, with a *white* Star in the Bottom ſhaded a little with *yellow*. The *Indian Chinces*, known ſo well to the Ladies, excellently repreſent the Colours of this pretty Flower. The *firſt* is hardy, and may be raiſed in the natural Soil, tho' it flowers not till Autumn: But the *laſt* expects the Aſſiſtance of a Hot-bed, and then it will continue a Succeſſion of its pretty Flowers from *June* to *September*, when the little black Seeds contained in the Husks ſhould be carefully gather'd and preſerv'd for future Uſe and Beauty; the whole Plant dying in the Ground at the approach of the firſt Froſt.

There

There is a *red-flowering Convolvulus* brought from the *Weſt-Indies:* But this is a greater Stranger amongſt us, and not ſo beautiful as the other.

Marvel of Peru. This is called by ſome the *Wonder of the World*, becauſe of the great Variety of its Flowers, even from the ſame Root; and becauſe, like the *Convolvulus*, it explains not its Flowers till near Sun-ſet, and ſhuts them up again in the Morning. This Flower dies for the moſt Part every Winter, and therefore muſt be raiſed from the Seed in a Hot-bed the Beginning of *April:* By which Means it comes to Maturity, and flowers all *Auguſt* and *September.* There are two Sorts of them, the one bearing *red* and *yellow* Flowers, and the other *purple* and *white*, the Colours intermix'd with great Variety. The *plain* Sorts are of no Value; and therefore great Care ſhould be taken to gather the Seeds from thoſe only which are variegated. All our late Authors (who follow one another in a Track) ſay, that laying Horſe Dung over the *young* Roots will preſerve them alive till Spring; and that if the *old* Roots be well dry'd, wrapt up in Woollen Rags, and ſo kept from Moiſture all the Winter within Doors, they will ſprout again in the Spring. But I venture to ſay there is no truſting to this Method. If ſuch a Thing *has* been; yet it is not *ordinarily* to be expected. Upon the Remove from the Hot-bed in *May*, give this Flower a rich Earth, a good Expoſure to the Sun, and free from Wind.

Female Balſam. This is another tender Plant, that wants the Aſſiſtance of the Hot-bed to bring it forward, that it may explain its Flowers before the Winter overtake it: It hath Leaves like thoſe of the Peach, and its Flowers are only of Self-colours, ſometimes *crimſon*, ſometimes *purple*, and ſometimes *white*, upon Stems ariſing about a Foot and half high. The firſt Froſt at the Beginning of Winter is its ſure Deſtruction; and ſo it muſt be raiſed every Year from the Seeds, which reſemble *Lentils.*

Sweet-Sultan. The *Sweet-Sultan*, ſo called, becauſe it is ſaid the *Grand Seignior* affected to wear it in his Turbant, is one of the Species of *Blue-Bottles*, not much unlike the *former*, bearing Flowers in Autumn on Stems two Foot high; ſome *white*, ſome *yellow*, and ſome *purple.* They are ſweet-ſcented according to the Name, and will not come to any great Perfection without the Aſſiſtance of an Hot-bed in *April.*

Capſicum Indicum The *Guinea Pepper* is chiefly admired for its long and round *Scarlet Fruit*, which it diſcovers from *Auguſt* till the Beginning of *October*, if it be aſſiſted in the Spring by an Hot-bed, otherwiſe the Summer will not ripen its Fruit. In hot Countries they pulverize the yellow Seeds of this Plant, and uſe it as Pepper; but it is *Scelerata Sinapis.* The Acerbity which the Pods give to the Tongue is very pungent; and yet ſome pickle them and uſe them in Sauce. They are impatient of the firſt and leaſt Froſt, and therefore die in the Winter, but may eaſily be raiſed from its Seed in the Spring.

Indian Creſs. The *Indian-Creſs*, by ſome called the *yellow Larkſpur*, is not only a pretty *Flower*, but acceptable in the *Sallet* Furniture. Its Flower is a beautiful *yellow* ſtrip'd with *black*, and appears earlier or later, as it is ſown or not ſown in an Hot-bed: For altho' it will come up in the naked Ground, nay the Seeds will lye two or three Years in the Earth and grow at laſt; yet for the Sake both of its Uſe and Beauty it is wont to be accelerated in the Hot-bed, that the Flowers may be obtained in *May*, and a Succeſſion of them continued till the Froſts come on.

Senſitive Plant.

I mention this here not as a *Flower*, but as an *Annual* of Curioſity to be raiſed and nouriſhed with Care in a Hot-bed; and the more it is aſſiſted that Way, the higher and bolder it will riſe, ſometimes to two or three Foot high. It is called the *ſenſible* or *ſenſitive* Plant; becauſe as ſoon as you touch it, the Leaf ſhrinks up together; but in a ſmall time after the Hand is removed, it recovers its Life and Vigour. Many Conjectures have been made concerning the Philoſophy of it. The plaineſt Reaſon of its ſudden Contraction is from the *Heat* of the Hand. It being a Plant whoſe Membranes and parenchymous Parts are very tender, by any ſudden Heat, it becomes much affected, and the Circulation of its Juices are ſtopt, juſt as admitting, of a ſudden, the direct Rays of the Sun upon a tender *Melon* or *Cucumber* Plant in *March* by opening the Glaſſes. This indeed is not ſo ſudden a Withering and Contraction of the Leaves, becauſe the Plants are not ſo tender; but in an Hour or two's Time we ſee the ſame Decay and Diſlike, ſometimes to their entire Loſs of Life. The merry Conceit of making this *Contraction* a Teſt of Virginity, is often a Banter upon the fair Sex.

I am ſenſible this chaſte Plant diſcovers its Averſion to outward Injury and Rudeneſs from the Admiſſion of ſudden *Cold* as well as *Heat:* Both Heat and Cold producing the ſame Effect from the ſame Cauſe, *viz.* Foraſmuch as *both* contract its Pores and Fibres: Theſe make the vapourous Juice, that maintains and preſerves the beautiful Verdure of its Leaves, retire, and ſo drives it down toward the Root. This Juice, which filled and ſwelled the circulatory Veſſels, being diſſipated, the Plant itſelf muſt undergo the ſame Fate; which, toward the End of Summer, for want of proper Juices for its Nouriſhment, never fails to overtake it; its Leaves muſt wither, contract and cloſe themſelves up. With Reſpect to ſudden Heat, we ſee the ſame thing, when we read before a Fire; the Cover of the Book is drawn back, for Want of that Moiſture, which the Fire has diſſipated.

But that there may be nothing wanting, both for the Inſtruction and Entertainment of all curious Inquirers into Vegetable Nature, I ſhall add and conclude with one Chapter more, *viz.*

CHAP. VIII.

Of the ſeveral Hindrances and Obſtructions to Improvement, and the general Annoyances to Vegetables, whether in the Field, *the* Foreſt, *the* Fruit-Garden, *or the* Flower-Garden, *with their probable Remedies.*

WITHOUT a prudent Care and Foreſight, much both of the Pleaſure and Profit of the Gardener and Husbandman will be loſt by accidental Annoyances and Injuries and external Accidents. And that *theſe* may be the better guarded againſt, and their probable Remedies rightly underſtood and timely apply'd, I ſhall diſtinctly conſider them, as they may be ſuppoſed to affect, either the *Field*, the *Foreſt*, the *Fruit* or the *Flower-Garden*, taken either ſingly or conjointly.

1. With Reſpect to the *Field*. The Impediments that generally hinder the Husbandmen from making the greateſt Advantage of their Ground, are either the Diſtempers of the Ground it ſelf, or ſome evil Accidents that occaſionally happen thereto, or to the Vegetables growing thereon.

The Diſtempers are generally cauſed, either by the abounding of Water, which cauſes Coldneſs and a dropſical Diſpoſition; or by the abounding of a dry barren Earth or Mineral, which being deſtitute of Moiſture, and thoſe nitrous Particles, which ſhould cauſe a Separation of the Parts, will not afford terreſtrial Matter fit to enter the Bodies of Vegetables for their Nouriſhment and Increaſe; or elſe the Accidents come by blaſting Winds, rapacious Fowl, Vermin, Weeds, Fearn, Heath Broom, and other unprofitable Vegetables, which impoveriſh and eat out the Heart of the Soil.

To prevent the Diſtempers occaſioned by the abounding of Water in ruſhy and boggy Land, I have already preſcribed the Remedy of deep Trenching, even a Foot or two below the Spring when it is diſcovered. And if theſe Trenches be made deep enough and frequent enough, there will be a ſingular Advantage gained by having the Matter taken out of the Trenches thrown upon the Soil, whereby the reſt will be conſiderably raiſed, and the Diſtemper often cured, tho' it ſhould ſo happen that no Drain can be obtained to carry off the Water.

After the Land is once laid dry, to cure its Coldneſs and untractable Nature, all ſuch Dungs and Compoſts are to be applied as are moſt fit by their Heat and Nitre to make a Separation of the Parts, as Lime, Rags, Soot, Pidgeon and Poultry Dung, *&c.* laid on diſcreetly, and not in too great Quantities, that they may not ſcorch or burn up the Graſs or Grain, inſtead of improving it. Sheeps Dung, Hogs dung likewiſe, and all Soil and Litter of Cattel, by Reaſon of their Dung, Urine, and Heat of their Bodies lying thereon, have a *Warmth* in them, and are fit for cold Lands on that Account; and indeed by Reaſon of their Moiſture for dry Lands alſo. For it is ſometimes found that Land may be *dry* and *cold* too, as many of our *Wood Lands* eſpecially are, where Lime and the Aſhes of Vegetables are found to be ſo ſingularly beneficial.

But as there is nothing in Animal Bodies but what affords excellent Manure, ſo in theſe Caſes, *Horns*, *Bones*, *Hair*, *Fleſh*, both of Beaſts, Fiſh and Fowl, are good and very rich: And thoſe that know the Virtue of them buy at Cities and Sea-port Towns, Woollen Rags, Sheep Trotters, ſtinking Fiſh, and other Offall of Animals to be mixed with other Soils.

But then again, where *Moiſture* is rather required than *Heat*, there floating (as I have before obſerved) by Land Floods, if practicable, and the Dirt and Mud of Ponds and Highways is moſt proper. For indeed Dryneſs is one of the greateſt Cauſes of Barrenneſs, and ſandy and gravelly Soils do moſt of all ſuffer this Way; and therefore whereſoever *Floating* can be practiſed, the Advantage to ſuch Soils and low Lands is incredible, provided the Damage from natural Floods and Inundations at unſeaſonable Times do not ſpoil all; or that the Water artificially ſuperinduced do not remain too long, ſo as to *make* Bogs and *breed* Ruſhes.

Another Remedy for light barren Land, and what I have mentioned under that Head, is *Marle*, the more greaſy and friable it is, the better, without Regard to the Colour, (for there is good of all Sorts.) For it gives that Tenacity which light Soils want, and hinders the Rains from ſinking away too ſoon, or being too ſoon exhaled by the Sun. *Chalk* alſo hath much of the Nature of *Marle*, but not ſo ſtrong nor durable.

Mr. *Higgens* is lately come into my Pariſh, having obtained a Patent for curing Sterility, for he hath invented a Preparation for manuring barren Lands, which is by *Lime* burnt three or four times over, and calcined into a Powder; a Buſhel of which he ſells for a Shilling, and ſaith it will go as far as ten or twelve in the ordinary Way. It ſeems poſſible enough to draw the Salts of Lime into a much leſs Compaſs, and to exclude all uſeleſs mineral Matter. But then the probable Effect of ſuch Calcination will be this, That it will have only the Nature and Property of Pidgeon Dung to exert itſelf for one Year, and leave no abiding Virtue behind. And that truly ſeems to be the Caſe (by what I can hitherto judge) of all the Chymical *Quackery* in Husbandry; and I doubt the new invented Liquor for infuſing Grain will not do ſo much.

Ant Hills are great Annoyances to the Husbandman; for even in wet Years the Graſs they bear, is worth little, and in dry ones they bear hardly any at all; therefore a good Husband in the three Winter Months takes out the Core or inward Parts and lays their Surface, *even* not *lower* than the other Level, that it may not hold Water. *Ant-Hills.*

Moles are alſo Enemies where they come, whatever the common People may fanſy; for by much burrowing of the Ground, the Summer Droughts more ſenſibly affect it than otherwiſe. There are many certain and expeditious Ways of deſtroying them by Traps well known and by a dextrous Management of a ſmall Spade; but the ſureſt Way of deſtroying the Breed is to find out their Neſts in *March* and *April*, which may be diſcovered by the largeneſs of the Heaps. Mr. *Speed* preſcribes red Herrings burnt on the Mole-Hills, or Garlick put in their Furrows to fright them away; which yet are but imperfect Cures. *Moles.*

The deſtruction of *Foxes*, *Badgers*, *Otters*, *Polecats*, *Hares* and *Rabbits* thoſe Enemies to the Husbandman muſt in the general be left to the Sportſmen; who yet for the moſt Part do more harm than good, and have not that tregard to the Induſtry and Labour of the Husbandman as they ſhould, when they trample Corn and break Hedges.

The Miſchief and Injury that is done among Grain, whether in Stacks or in the Barn, by *Mice* and *Rats* where they abound, is vaſtly great: And many Contrivances there are to *deceive* as well as to *kill* them. For the *firſt* Purpoſe, the making of Stavels with ſtone Caps, and Granaries deſcribed already under that Head, is moſt effectual and ſecure; and all the Contrivances of Traps do little for the *latter* in Compariſon of a good Cat, if ſhe can but have acceſs to the Places where they harbour moſt. But ſurely the Method of Poiſon ſhould be refuſed, as not anſwering the End beſt and yet the moſt dangerous.

Crows, *Ravens*, *Rooks* and *Jack-daws*, do incredible Miſchief to the Husbandman, both in Seed-time and in Harveſt, and yet if their Neſts and Young ones were watched and deſtroy'd, their Multitudes might ſoon be leſſened. However Mr. *Blith*'s Invention of a Scare-Crow hath been experimentally found to be of ſingular Uſe. Kill (ſaith he) a Crow or two in the Place where they moſt haunt, and before the Corn is cut; there make an Hole about a Foot deep, and two Foot over. Stick the long black Feathers of a Crow round the Edges thereof, and ſome at the Bottom. Several of theſe Holes may be made if the Ground be large, and the Carcaſſes tyed upon an upright Stick; for the Holes thus dreſſed, eſpecially if the Feathers are greaſed ſo as to make Gunpowder ſtick on them, (which is a further Improvement) will for ſome Weeks affright all the Crows away.

Sparrows alſo are a devouring Bird, great Breeders, and come in great Multitudes. Some ſay it is to little purpoſe to deſtroy their *Young ones*, eſpecially the firſt Brood, for that they preſently betake themſelves to their Mate, lay and breed afreſh; whereas if the Young ones be ſuffered to fly, the old ones wait upon *them* and breed no more. So that the beſt Way is to take the Seaſon in *March* or *April* (or indeed any time in Winter) to deſtroy the *old ones*, which is moſt effectually done by the large folding Sparrow-Net, which will take many dozens at one fold; if the Place be diſcreetly baited with Chaff and the Net covered therewith from ſight, at a Time eſpecially when Food is ſcarce.

I have already directed the Remedy to prevent Smuttineſs in *Wheat* under that Head; which, tho' it is a great Evil and Damage to the Husbandman is yet moſt effectually cured by *Soaking*, not *Sprinkling* the Seed in Brine twelve Hours, and juſt before ſowing, dry it with *Lime*.

But there are ſtill ſome other Annoyances to the Husbandman's Farm proceeding from the *Vegetables* growing thereon; as for Inſtance, *Furze*, *Broom*, *Fern*, *Heath*, *Ruſhes*, *Thiſtles*, *Couch-Graſs*, *Carlock*, *and Wild Oats*, &c.

Furze. I cannot find but Land of every Nature and Kind is ſubject to bear *Furze*, and ſometimes it will bear them ſo long that it will bear almoſt nothing elſe, at leaſt without great Charge and Pains. But it is certainly the Diſgrace of every Farmer to ſee them in any Plenty about him; and therefore he ſhould ſet himſelf in earneſt to deſtroy them Root and Branch as an unprofitable Vegetable, except in ſuch Places where Fuel is extremely dear and ſcarce. Experience ſhews that *Tillage* alone and plowing up the Roots will not do; for when the Land is laid down again, they preſently ſpring from the Roots and Fibres remaining in the Ground, and without further Care will but more and more over-run the Ground. Their ſpringing again therefore muſt be watched, and their Deſtruction repeated by a ſharp Pick-Ax in hot Weather, and after this if you lay a ſufficient Quantity of Dung, Lime or Marle, they will then be effectually deſtroyed and you'll ſee no more of them.

Broom. The moſt pernicious Plant or weedy Shrub that annoys the Farmer is *Broom*, which as it ſheds but few Leaves, ſo it continually ſucks out the Heart of the Land it grows upon. The Ways commonly recommended to kill it, ſuch as plowing, burn-bating, manuring with Dung, &c. prove all ineffectual: But foraſmuch as I have received ſomething worth communicating to the Publick on this Head from my worthy Friend and Neighbour Sir *William Huſtler* in *Yorkſhire*, I ſhall here ſet down what hath been the Reſult of his long Experience in this Matter.

"My Situation (ſaith he) being upon a Sandy Land, productive e-
" nough of Graſs, but apt to put up *Broom* and *Fern* ſo as to cumber
" the Ground; the *Former* of theſe I think I can deſtroy, and have
" done ſo, by cutting with a Knife, Hook, or any ſuch fitting Inſtru-
" ment the Stalk of ſuch Broom near a Handful above the Ground a-
" bout *Midſummer*, which never ſhall produce any more till that
" Ground be opened again by plowing or digging; which Land ſo ad-
" dicted (tho' having been freed from Broom for twenty Years) will be
" as full as ever: And no Remedy could I ever find but the above Me-
" thod. I have been told that the ſame would have the like effect up-
" on *Brackens* or *Fern*; but I have experienced the contrary; and
" ſhould be glad to be rid of this Grievance." And this Difficulty comes next in our Way;

Fern. For *Fern* is undoubtedly one of the worſt of Weeds, and hard to be deſtroyed, where it hath any thing of a deep Soil to root in, its Roots extending ſometimes eight Foot deep. The beſt Remedy is often mowing whilſt in Graſs, *i. e.* for ſeveral Years twice a Year in *May* and in *Auguſt*. And when the Land is plowed up, *Lime*, *Marle*, *Aſhes* or *Rags* ſtrewed well over it will perfect the Cure. This Evil hath one good Quality attending it, that if cut when the Sap is in it and left to rot upon the Ground, is a very great Improver, and will mellow the Land ſo as to prevent its binding. And its Aſhes after burning are ſuppoſed to yield double the Quantity of Salt that any other Vegetable will do, inſomuch that in ſome Places they uſe them inſtead of Soap to waſh their Linnen with. Some have ſaid that much treading the Ground with a double Quantity of Cattle is an infallible Way to kill them: But this I dare not anſwer for.

Heath, Ruſhes. *Heath* and *Ruſhes* are killed more eaſily by the Plough, and the latter without it, if the Ground where they grow be well drained and kept free from ſtanding Wets in the Winter, and be well covered with Horſe-dung.

Thiſtles. *Thiſtles*, tho' they are a certain Indication of Strength and Richneſs of Soil, yet they overſhaddow and hurt both Graſs and Corn. The beſt Way and Time to deſtroy them is to mow them down juſt before they come to Seed, and it is very rare to find after that, that they will outlive the Winter at the Root. But from amongſt the Corn they muſt be cut down with a ſmall Hook the latter End of *May* or Beginning of *June*.

Couch-Graſs. *Couch-Graſs* is a pernicious Weed, keeping the Land hollow and looſe and much draining away its Riches. It is ſoon killed by laying it down to graſs; but whilſt the Land is in Tillage it ſhould be frequently fallowed in dry Weather, and well harrowed, cleaning the Teeth of the Harrow at every turning. Such Land is not fit for Winter Corn; but white Oats that are ſown late will overtop and help to kill it.

Carlock. *Carlock*, which is ſuppoſed to be bred chiefly from Cow-dung, is a moſt ſpreading Weed from the Seed, and will ſoon over-top a Land of Barley with its yellow Flowers. It is the moſt harmleſs Weed both in its Roots and Branches which are few, and die away before the Corn flouriſhes in the Ear. Some have ventured to mow off its Tops in *May*, and thereby killed the greateſt Part: But where the Land is ſubject to Weeds that are increaſed by Seed, the beſt Way is to lay it down ſome time with Graſs-ſeed, and feed it.

Wild Oats. *Wild Oats* increaſe much in wet Years and open Winters, and are very hard to be deſtroyed. Some recommend the ſowing *Beans*, where they are apt to grow, taking it for granted that Sheep turned amongſt them, will eat only the *Wild Oats* and let the Beans alone: But that is not always to be depended on; for tho' the Tops of Beans are bitter; yet Sheep are tempted and known to eat them while they are green and tender. A dry Summer Fallow or two is the beſt Cure.

Moſs. 2. I come now to ſay ſomething of ſuch Annoyances and Injuries as affect the *Foreſt* and Field-Plantations. When the Bodies or Stems of Trees are much infeſted with *Moſs*, it is a certain Indication that the Roots reach a cold Gravel or Clay or ſome ſpewy Soil full of Wet or Springs that cauſes *Moſs* and hinders their flouriſhing. To rub off the Moſs with a Hair Cloth in wet Weather is good; but the beſt preventing Remedy is to plant high on the Sides of deep Drains.

Rubbing. The Rubbing of Cattle is another great Injury to new Plantations; and their venomous gnawing off the young Shoots is a worſe. It is therefore better never to plant at all, than not ſufficiently to guard the Trees from ſuch external Violences. Where the whole Plantation is a *Grove* or *Wood* or *Foreſt*, the whole may be eaſily encloſed at once and made to forbid the Entrance of ſuch Cattle at leaſt as hurt or wound the new ſet Trees; or if the Trees are planted in Hedge-rows, a Ditch on one Side and a dead Hedge on the other will effectually ſecure them; but where Foreſt-Trees are planted in Rows for Avenues, there muſt be an effectual Defence made for every ſingle Tree, which is beſt done either of theſe two Ways: Firſt, by three upright ſturdy Poſts ſet in a Triangle about the Tree, and held together by two croſs Rows of ſtrong Laths; or ſecondly, (which is much the cheapeſt Way) by *tumping*; *i.e.* by raiſing a Circle of good Earth two or three Foot high, and ſix Foot diameter round the Tree, leaving the Ditch, from which the Earth is taken round about, as deep as poſſible: This effectually ſecures each Tree from being gnaw'd or rubb'd by Cattle; And in ſpewy boggy Grounds is an excellent Remedy to prevent the Roots being drowned with too much Wet. But in this Method it muſt be remembered, that the Trees muſt be planted on the Surface, and not put into a Hole before the Earth is raiſed about them.

Rooks. Thoſe who love the Noiſe of *Rooks* will not perhaps think them Annoyances; but it is plain to a Demonſtration their neſtling in ſuch Flocks amongſt Timber and Forreſt-Trees, is a mighty Hindrance to their Growth and Thriving. Their Dung is Poiſon wherever it falls; and their Neſts, which are compoſed of the tender Branches of Trees, are conſtant Annoyances to the Tops, and much check and retard their Growth.

As to what particularly reſpects the *Fruit* and *Flower-Garden*, and their Enemies, there needs not *much* be ſaid here, having in great Meaſure already ſpoken thereof under the Chapter of *Blights*. But I muſt firſt lay in this Caution, That there is no greater Hindrance to the Growth and Thriving of all Vegetables, than to be ſo crowded together, that their Roots, Branches and Leaves interfere one with another. Therefore in all Orchard and Garden Plants, whoſe Fruit and Flowers you would have fair and beautiful, and whoſe Growth you would expect conſiderable,

ſiderable, take Care that they keep their Diſtances. *Apples*, *Pears*, *Plumbs*, *Cherries*, and other Fruit-Trees are of divers Statures, both in Regard of one another, and of their own Kind; ſome of greater Extent than others, Pears eſpecially larger than Apples: So that it is hard to appoint one certain Diſtance for Trees in an Orchard. *Eight Yards* I always think little enough in the general Standard for Apples and Pears: But after all, the moſt certain Rule is, to take Care that one Tree do not ſhade another; and therefore to let the loweſt Trees (if you intend to make the moſt of your Ground) be ſet on the *South* Side, and the higheſt Pear-Trees on the *North*; for ſhould the higher Trees ſtand *South*, they would caſt their Shade over the reſt of the Orchard.

It muſt be either Ignorance or Covetouſneſs that ſhall prompt any one to crowd Fruit-Trees into a little Room: But it is eaſily demonſtrable that a proper Quantity of Trees will bear more Fruit, than double the Number in Exceſs.

The Fairneſs and Largeneſs of Flowers and Fruits are very much augmented, by preventing the running up of a Multitude of Stalks from the ſame Root. The curious Floriſt obſerves this nicely in his *Carnations*, not ſuffering above one or two Spindles upon ſuch Roots or Stools where he intends a greater Fulneſs and Largeneſs in the Flowers. *Shrubs* likewiſe that bear either Fruits or Flowers are to be governed in like Manner. For every one knows that *Gooſeberries* and *Currants* degenerate to Smallneſs, or bear not at all, without this Care and Proviſion that the *Suckers* be taken away. And how to prevent them I have ſhewn particularly under that Head.

Thus alſo the ſeveral *Roſes*, when they grow up to thick Buſhes, do not bear ſo well; but being kept to one ſingle Stem, and diſcreetly pruned (not being deprived of the Sun) they bear abundantly, the *Damask* eſpecially. Accordingly the weak Shoots of *Vines* are great Robbers, and ſhould be carefully removed both in Winter and Summer, to give Strength to the larger Branches and the Fruit.

There are yet ſeveral other Annoyances to Vegetables in the Fruit and Flower-Garden, which I ſhall juſt mention before I conclude this Chapter. *Piſmires* are exceeding troubleſome in ſome Gardens, and the beſt Remedy I find, is what I have formerly preſcribed *, *viz.* to cut *Dew-Worms* in Pieces (upon which they will gather) and then kill them with ſcalding Water out of a wat'ring Pot. *Earwigs* are great Enemies and Deſtroyers of *Carnations*; but they may be catched in the hollow Hoofs of Beaſts put upon the End of a Stick ſet in the Ground. *Caterpillars* are beſt deſtroyed in their Eggs. There is a very bad Sort that uſually lodges in the rough Stems of Gooſeberry-Buſhes all the Winter, and in the Spring ſally out to deſtroy their Leaves, and the Bloſſoms of Apre-cots and Peaches: Theſe, when diſcovered, ſhould be ſhaken off upon Cloths laid under the Buſhes, and pick'd off occaſionally from the Fruit-Trees. The Decays and Rottenneſs that ſome bulbous Roots are ſubject to through too much Moiſture, is beſt *cured* by opening the Root, and applying a dry ſandy Earth to the Part; but it is beſt *prevented* by laying the Borders like a Carp's Back, *gibbous*, with ſuch high Ridges as may throw off the Winter Wets. Moſt *Cherry-Trees* are apt to be Hide-bound, the Muſcles of their Bark covering the Wood horizontally; and this Diſeaſe often makes them dwarfiſh, but the Cure is eaſy and very effectual: *viz.* to ſlit down the Bark perpendicularly with a Knife.

* *Gentleman's Recreation.*

The CONCLUSION.

AS this whole foregoing Syſtem has been in Effect no other than an Explanation and unfolding of Nature's Riches, it is very fit, and very decent, that the ſumming up and Recapitulation of the *whole* ſhould be in a devout admiring and adoring the Wiſdom, Contrivance, Curioſity and Skill of the Great Creator and Former of the vegetable Kingdom.

It was the great Sin and Blemiſh of the Heathen World, that in the Contemplation of the Beauty and Uſefulneſs of the *Creature*, they did not raiſe their Minds to conſider the Wiſdom of the *Creator*. The Particulars that offer themſelves to a thinking Mind to aſſert a Providence, and to confute the Vanity of the old Epicureans are infinite; and it would too much enlarge the Bounds of my preſent Purpoſe, to engage too far in ſhewing the great Variety there is both of Trees and Plants provided for all Ages, and for every Uſe and Occaſion of Life: Some ſoft, ſome hard, ſome ſtrong, ſome tough, ſome long and tall, others ſhort and low, ſome thick and large, others ſlender and ſmall; proper either for Building, or Tools, or other neceſſary Utenſils: Some for Food, and ſome for Pleaſure, as hath been already deſcribed.

If one were to ſurvey the curious Anatomy and Structure of the Bodies of Plants, and ſhew the admirable Proviſion made for the Conveyance of the animal Juice or Sap, the Variety and Texture of their Leaves, the Gaiety and Fragrancy of their Flowers, the wonderful Method of their Generation by Male and Female Parts *, the great Care Nature has taken of the Conſervation and Safety of the Seed and Fruit, by ſeaſonable and well fenced Coverings: If to theſe Conſiderations one were to add the various Ways of Nature in *diſſipating* and *ſowing* the Seed, and afterwards in the nice Proviſion that is made for their Support and Aid in *ſtanding* and *growing*, ſo as to miniſter to the Ends and Uſes of Life: And for ſuch Vegetables as are weak, and not able to ſupport themſelves, the wonderful Faculty they have ſo readily and naturally to make uſe of others ſtronger than themſelves, thereby uſing them as *Crutches* to their feeble Bodies; ſome by their odd convolving Faculty, by twiſting themſelves like a Screw about others; ſome by catching at, and (as it were) graſping for Help by their *Cluſters* and *Tendrels* †, equivalent to Hands: All which various and ſurprizing Methods, being ſo nicely accommodated to the Indigencies of thoſe helpleſs Vegetables, is a manifeſt Indication of their being the Contrivance of ſome great Artificer; and that the Author of Nature doth γεωμετρεῖν in them, and characterize out ſuch Variety of elegant Figures, that every Plant ſhall ſeem to have more of Mathematical Art than the moſt maſterly Hand can ſhape or faſhion.

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* *See* Bradley *Chap.* Of the Generation of Plants.

† Claſpers *are of a compound Nature between that of a Root and of a Trunk. Their Uſe is ſometimes for Support only, as in the Claſpers of Vines, Briony,* &c. *whoſe Branches being long, ſlender and fragile, would fall by their own Weight and that of their Fruit. But theſe Claſpers taking hold of any thing that is at hand; which they do by a natural Circumvolution which they have. Thoſe of Briony have a retrograde Motion about every third Circle, in the Form of a double Claſp, ſo that if they miſs one Way, they may catch the other. Sometimes the Uſe of Claſpers is alſo for a Supply, as in the Trunk Roots of Ivy, which being a Plant that mounts very high, and being of a cloſer and more compact Subſtance than that of Vines, the Sap would not be ſufficiently ſupplied to the upper Sprouts, unleſs theſe aſſiſted the Mother Root; but theſe ſerve alſo for Support too. Sometimes alſo they ſerve for Stabiliment, Propagation and Shade. For the firſt of theſe ſerve the Claſpers of Cucumbers: For the ſecond, thoſe, or rather the Trunk Roots of Camomile; and for all three the Trunk Roots of Strawberries.* Harris Lex. in verb. *Claſpers.*

Why, for Inſtance, have thoſe Plants that bear little or no Seed with us (as the *Poplar* and *Sallow*, *&c.)* in every Bough a Propenſity of ſending forth Roots; by the Occaſion whereof, each Branch is made an entire Tree or Plant? And why for Want of Off-ſets hath Nature made the Muſhroom propagable by the ſmalleſt of their Shreads and inconſiderable Parts? And why is the *Indian Fig*, that hath no Stalk, to be propagated only by its Leaves?

Again, Why have Plants ſuch an Eagerneſs to flower and ſeed, and ſuch an Impatience of being diſappointed? For if you pull off the Bud of the Roſe, it will puſh for a Roſe again? But indeed moſt other Flowers and Fruits have the ſame Deſire to produce their Seeds, and therefore have given Occaſion for Artiſts to make Rules of Retardation.

Again, Why do the Seeds ſtick cloſe to the Pedal by which they are joined to the Stock until they are ripe and fit for Propagation, and then fall off in the moſt fit Seaſon for future Growth?

Why do thoſe Plants that uſually die every Year, yet if they are diſappointed of running to Seed, continue to ſurvive many Years; even ſo long till they are permitted to run up to leave Seed behind them: But that they are appointed by the univerſal Law of Nature not to deſert their Order, till they have ſettled a Succeſſion, or produced others of their own Kind?

What ſhould be the Meaning that Nature in Vegetables for the moſt Part obſerves the *Quincunx Order*, of one Sort or other, in the Situation of the Buds and Leaves, from whence the Eruptions and future Shoots are made, but that an uniform Equilibration, and Uprightneſs of Trees may be preſerved? For ſhould all the Boughs break out in one Place, or on one Side; that Side would preponderate, would bend down the Body into an unſeemly Crookedneſs, and deprive it of that Uniformity and Straitneſs, which is ſo neceſſary for its Health and Vigour. And it may be obſerved that thoſe Plants which are without theſe Regulations are generally ſuch as are made to grow upon and twiſt about other Things, and not to bear up themſelves; as the *Hop*, the *Bind-Weed* and the like.

What, I ſay, ſhould be the Meaning of all this, and many more Inſtances that might be given of *Art* and *Contrivance* in the Formation of Vegetables; and of *Wiſdom*, in making them ſubſervient to allay the Pains and Miſeries *, and to ſupply the † Wants and Neceſſities of human Nature, but that there is one ſupreme, wiſe intelligent Agent that doth preſide over, and govern every the minuteſt Part of the Univerſe, diſpoſing all Things in Number, Weight and Meaſure; and, to all the rational Part of the Creation, affording ſuch plain Impreſſes of the divine Wiſdom and Care, as manifeſt the Providence and Superintendence of GOD, the great, the adorable, the infinite Creator?

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* Tales Plantarum Species in quacunque regione à Deo creantur quales Hominibus & Animalibus ibidem natis maximè conveniunt: Immo ex Plantarum naſcentium frequentia ſe ferè animadvertere poſſe, quibus morbis quælibet regio ſubjecta ſit, ſcribit Solenander. Sic apud Danos, Friſos, Hollandos, quibus ſcorbutus frequens, Cochlearia copioſè provenit. *Ray Hiſt. Plant. l.* 16. *c.* 3.

† *'Tis an admirable Proviſion made for ſome Countries ſubject to Drought, that when the Waters every where fail, there are Vegetables which contain not only Moiſture enough to ſupply their own Vegetation and Wants, but afford Drink alſo both to Man and other Creatures in their great Extremities.* Derham, Phyſ. Theol. pag. 433.

Dr. Sloane's *Deſcription of the* wild Pine *is, that its Leaves are channelled fit to catch and convey Water down into their Reſervatories; that theſe Reſervatories are ſo made as to hold much Water, and cloſe at Top, when full, to hinder its Evaporation: That theſe Plants grew on the Arms of the Trees in the Woods, as alſo on the Barks of their Trunks.* See Phil. Tranſ. Nº 251.

To whom be aſcribed all Glory, Honour, Worſhip, and Praiſe, Thankſgiving and Power, ἐις τȣ̀ς αἰῶνας τ̃ αἰώνων, *for ever.* Amen.

FINIS.